United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Tanadgusix Native Corporation; City of Saint Paul, Alaska; U.S. Department of the Interior, Fish and Wildlife Service; U.S. Department of Commerce, National Marine Fisheries Service; University of Alaska Fairbanks, Agricultural and Forestry Experiment Station; and the Aleut Corporation

Soil Survey of Saint Paul Island Area, Alaska

How To Use This Soil Survey

This survey should be used by anyone with a question regarding the soils of Saint Paul Island, Alaska, and their properties. The soil map in this survey and the accompanying soils legend provide an overview of the types and arrangements of the soils on the landscape. In the sections “How This Survey Was Made,” “General Nature of the Survey Area,” and “Formation of the Soils,” the process of preparing a soil survey is explained and the climatic and physical environment of the survey area are described.

To find information regarding a specific area, locate that area on the soil map. Note the map unit symbols that are in the area. The Contents lists the map units by symbol and name and shows the page where each map unit is described.

The interpretive tables at the end of this survey relate the physical and chemical characteristics of the individual major components of the map unit, provide general information regarding flooding and wetness for each map unit, and describe the suitability or limitations for particular uses. The Contents shows which table has data on a specific land use for each detailed soil map unit. See the Contents for other sections of this publication that may address your specific needs.

The scale at which the information in this soil survey is presented is not intended to be suitable for site-specific planning. Map units can be highly variable; the information given in this survey represents the range of properties encompassed in all delineations of each map unit symbol. Any specific location should be examined to determine the exact nature of the soils at that site.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1998. Soil names and descriptions were approved in 2000. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1998. This survey was made cooperatively by the Natural Resources Conservation Service; the Tanadgusix Native Corporation; the City of Saint Paul, Alaska; the U.S. Fish and Wildlife Service; the National Marine Fisheries Service; the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station; and the Aleut Corporation. The survey is part of the technical assistance furnished through the Alaska Soil and Water Conservation District.

The soil map in this survey may be copied without permission. Enlargement of the map, however, could cause misunderstanding of the detail of mapping. If enlarged, the map does not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Typical landscape on Saint Paul Island. In the foreground are a beach terrace and dunes. Dipslopes and rocky uplands are in the middle ground. The volcanic cone in the background is Bogoslof Hill.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov (click on "Technical Resources").

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Foreword

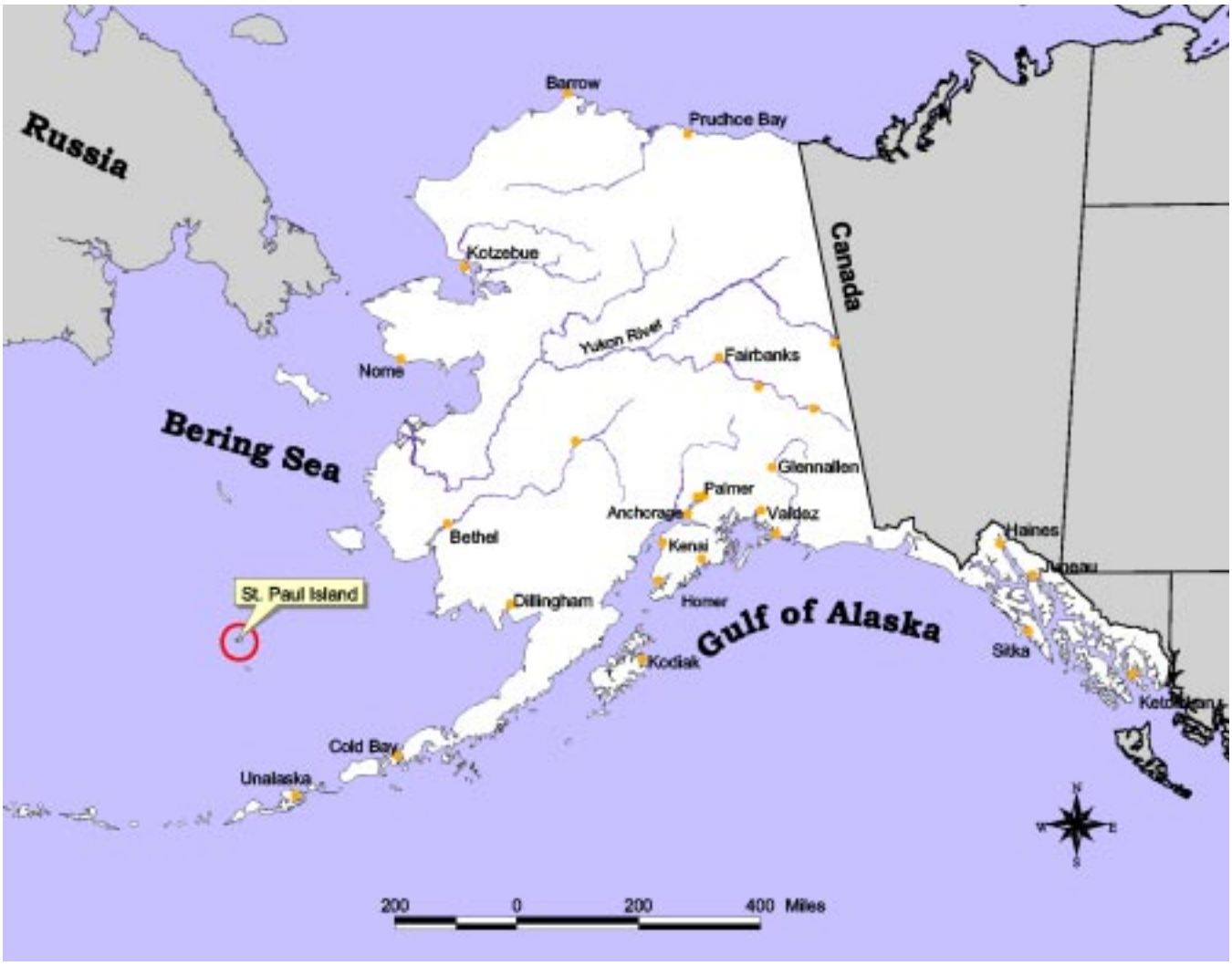
This soil survey contains information that can be used in land-planning programs on Saint Paul Island. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Reindeer herders can use it to evaluate the potential of the soil and the management needed for good livestock management. Government agencies, community officials, Alaska Native tribes, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Many of the soils formed in volcanic ash and have unique properties that can influence plant growth and engineering stability.

Help in using this publication and additional information are available at the Homer office of the Natural Resources Conservation Service, the Alaska Soil and Water Conservation District, or the Alaska Cooperative Extension Service.

Charles W. Bell
State Conservationist
Natural Resources Conservation Service



Location of the survey area in Alaska.

Soil Survey of
Saint Paul Island Area, Alaska

By Michael Mungoven, Natural Resources Conservation Service

Fieldwork by Michael Mungoven, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
Tanadgusix Native Corporation; City of Saint Paul, Alaska; U.S. Department of the Interior, Fish and Wildlife Service; U.S. Department of Commerce, National Marine Fisheries Service; University of Alaska Fairbanks, Agricultural and Forestry Experiment Station; and the Aleut Corporation

General Nature of the Survey Area

Saint Paul Island is the largest and most northerly island in the Pribilof island group, located in the central Bering Sea, Alaska. The Pribilofs rise approximately 1,100 feet (361 meters) off the shallow Bering Sea floor. During the lowest sea level intervals over the past 40,000 years, Saint Paul has been contiguous with the Bering land bridge (Hopkins, 1959). Saint Paul Island has a surface area of approximately 27,000 acres (10,927 hectares). The geologic materials making up Saint Paul Island are predominantly layered basaltic lava flows and intercalated sedimentary beds. Deforming upward and extruding through these lava flows are numerous explosion craters with associated pyroclastic deposits (Barth, 1956). The fissuring and eruptions that formed these beds and cones have occurred during the last 400,000 years (Hopkins and Einarsson, 1966); the most recent lava flow on the southwest corner of the island may be as young as 3,000 to 5,000 years old. Lava tubes and other volcanic features are associated with these flows. Elevations of the lava flows and volcanic cones on Saint Paul Island range from sea level to 660 feet (0 to 201 meters).

Sandy material covers much of the area between sea level and an elevation of 120 feet (37 meters) on the north and east sides of the island. This material is of late-Pleistocene to Holocene age and is probably associated with late-Pleistocene eolian sand sheets found throughout southwestern Alaska (Lea and Waythomas, 1990). Sandy material also occurs in the lower landscape positions near the coast on the south and west sides. Marine transgressions since the mid-Pleistocene have generated at least two distinct strand lines visible on the north side of the island (Hopkins and Einarsson, 1966). These transgressions have likely reworked and mixed the sand in some areas with glassy volcanic pyroclastics. Active dunes occupy much of the northeast corner of the island.

The basalt bedrock is commonly fractured, and the fractures allow most precipitation to percolate freely. The island has few incised drainageways and no rivers or persistent streams. There are a few small wet areas, generally at the base of steep uplands, which support wetland plant communities. The soils in these areas have a thick organic surface layer. A water table occurs on the plain that runs across the east side of the island from Telegraph Hill to Big Lake. All of the larger lakes on the island lie on this plain. On the lower portions of this plain, the water table is within 6 feet (2 meters) of the soil surface.

The vegetation on the island is characterized by low shrub tundra in the uplands and grassy-herbaceous communities on the lower hills, plains, and dunes. There are no trees, and the tallest shrubs are generally less than 3 feet (1 meter) in height.

Saint Paul Island has a maritime subarctic climate characterized by long, cold winters and short, cool summers. The average temperature in the summer (June, July, and August) is 45 degrees F (7 degrees C), and the average temperature in the winter

(November through March) is 27 degrees F (-3 degrees C). The average annual precipitation is 24 inches (61 cm); July and August are generally the wettest months, and April is the driest. Snow covers the ground continuously from October to late April or early May. Table 1 provides data on temperature and precipitation for the survey area during the period from 1949 to 1997. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, the growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. To characterize and map the soils, soil scientists dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The soil scientists also observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of native plants; and the kinds of geologic materials.

Before the fieldwork was begun, relevant information on the climate, geology, geomorphology, hydrology, and vegetation of the survey area was assembled. Aerial photography of the survey area was acquired and prepared for field use and mapping. Aerial color photography taken in 1993 at a scale of 1:24,000 was used for field mapping. Fieldwork for the soil survey was conducted between July 7 and August 14, 1998.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Detailed Soil Map Units

The map units delineated on the detailed soil map in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the map, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on the soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They are described in the map unit description as similar soils. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the map. The contrasting components are described in the map unit descriptions as minor components. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Map units that consist of one major component are called *consociations*. Typic Cryaquents, sandy, 0 to 3 percent slopes, is an example.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are called complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the map. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Typic Haplocryands, moderately deep-Lithic Haplocryands, rubbly, complex, 1 to 8 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Dumps, landfill, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see Contents) give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

1—Aquic Dystrocryepts, 0 to 3 percent slopes

Elevation: 20 to 39 feet (6 to 12 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Aquic Dystrocryepts and Similar Soils

Extent: 65 to 90 percent of the map unit
Landform: Depressions on plains
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Slope length: 328 to 1,148 feet (100 to 350 m)
Parent material: Sandy eolian deposits over sandy and silty alluvium
Depth to bedrock (lithic): 39 to 79 inches (100 to 200 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Very low
Drainage class: Somewhat poorly drained
Flooding: None
Depth to high water table (approximate): 28 inches (70 cm)
Ponding: Rare
Available water capacity (approximate): 5.8 inches (15 cm)
Ecological site: Forb/Sedge Tundra
Typical profile:
Oe—0 to 2 inches (0 to 4 cm); mucky peat, rapid permeability
A—2 to 4 inches (4 to 9 cm); fine sandy loam, moderately rapid permeability
Bw—4 to 24 inches (9 to 60 cm); sand, fine sandy loam, rapid permeability
C1—24 to 28 inches (60 to 70 cm); fine sandy loam, moderately rapid permeability
C2—28 to 55 inches (70 to 140 cm); stratified loamy sand to sandy loam, moderately rapid permeability
2R—55 inches (140 cm); bedrock

Minor Components

• Soils that are very poorly drained: 0 to 35 percent of the map unit

Management Considerations

Soil-related factors: Water table, erosion hazard
Current uses: Rangeland
Potential uses: Rangeland

2—Aquic Haplocryands-Andic Haplocryods complex, 1 to 8 percent slopes

Elevation: 20 to 82 feet (6 to 25 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Aquic Haplocryands and Similar Soils

Extent: 30 to 60 percent of the map unit
Landform: Drainageways on dipslopes
Position on slope: Backslopes
Slope shape: Convex or linear downslope; convex or linear across the slope
Slope range: 1 to 8 percent
Slope length: 525 to 984 feet (160 to 300 m)
Parent material: Coarse-loamy colluvium derived from basalt over loamy residuum derived from basalt
Depth to bedrock (lithic): 20 to 59 inches (50 to 150 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Very low
Drainage class: Somewhat poorly drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 6.0 inches (15 cm)
Ecological site: Grassy Meadow
Typical profile:
Oe—0 to 3 inches (0 to 8 cm); stony mucky peat, rapid permeability
A—3 to 8 inches (8 to 21 cm); stony medial silt loam, moderately rapid permeability
Bw—8 to 16 inches (21 to 41 cm); medial cobbly fine sandy loam, moderately rapid permeability
BC—16 to 24 inches (41 to 60 cm); cobbly silt loam, moderately rapid permeability
2C—24 to 29 inches (60 to 73 cm); gravelly silt loam, moderately rapid permeability
2R—29 inches (73 cm); bedrock

Andic Haplocryods and Similar Soils

Extent: 30 to 50 percent of the map unit
Landform: Earth hummocks on drainageways
Position on slope: Backslopes
Slope shape: Concave or linear downslope; linear or concave across the slope
Slope range: 1 to 8 percent

Slope length: 328 to 656 feet (100 to 200 m)
Parent material: Loamy colluvium and/or sandy eolian deposits over colluvium derived from basalt and/or residuum derived from basalt
Depth to bedrock (lithic): 20 to 59 inches (50 to 150 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Very low
Drainage class: Moderately well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 11.1 inches (28 cm)
Ecological site: Grassy Meadow
Typical profile:
Oi—0 to 4 inches (0 to 9 cm); peat, rapid permeability
EA—4 to 8 inches (9 to 20 cm); medial silt loam, moderately rapid permeability
Bs—8 to 13 inches (20 to 33 cm); medial very fine sandy loam, moderately rapid permeability
2BC—13 to 35 inches (33 to 88 cm); very stony silt loam, moderately rapid permeability
2C—35 to 54 inches (88 to 138 cm); very stony silt loam, moderately rapid permeability
2R—54 inches (138 cm); bedrock

Minor Components

- Rubble land, boulders: 0 to 10 percent of the map unit

Management Considerations

Soil-related factors: Extremely stony surface in some areas, bouldery areas, moderate erosion hazard
Current uses: Rangeland
Potential uses: Rangeland

3—Beaches, rocky

Elevation: 0 to 16 feet (0 to 5 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Beaches, Rocky

Extent: 95 percent of the map unit
Landform: Beaches
Slope shape: Linear downslope; linear across the slope
Slope range: 1 to 25 percent
Ecological site: Rocky Beach

Minor Components

- Beaches, sandy: 5 percent of the map unit

Management Considerations

Soil-related factors: Bare wave-washed rock
Current uses: Wildlife habitat
Potential uses: Wildlife habitat

4—Beaches, sandy

Elevation: 0 to 16 feet (0 to 5 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Beaches, Sandy

Extent: 95 percent of the map unit
Landform: Beaches
Slope shape: Concave or convex downslope; concave or linear across the slope
Slope range: 3 to 15 percent
Ecological site: Sandy Beach

Minor Components

- Beaches, rocky: 5 percent of the map unit

Management Considerations

Soil-related factors: Frequent wave action
Current uses: Wildlife habitat
Potential uses: Wildlife habitat

5—Beaches, tidal

Elevation: 0 to 3 feet (0 to 1 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Beaches, Tidal

Extent: 100 percent of the map unit
Landform: Tidal flats
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 1 percent
Ecological site: Mud Flats

Management Considerations

Soil-related factors: Flooded daily
Current uses: Wildlife habitat
Potential uses: Wildlife habitat

6—Bogoslof silt loam, 0 to 3 percent slopes

Elevation: 39 to 59 feet (12 to 18 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Bogoslof and Similar Soils

Extent: 85 to 90 percent of the map unit
Landform: Terraces on plains
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Slope length: 262 to 656 feet (80 to 200 m)
Parent material: Coarse-loamy eolian deposits derived from scoria over sandy alluvium and/or sandy eolian deposits
Hazard of erosion (organic mat removed): By water—slight; by wind—severe
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 8.2 inches (21 cm)
Ecological site: Crowberry (Lowland)
Typical profile:
Oi—0 to 2 inches (0 to 4 cm); peat, rapid permeability
A—2 to 4 inches (4 to 9 cm); medial silt loam, moderately rapid permeability
Bw—4 to 13 inches (9 to 32 cm); medial fine sandy loam, moderately rapid permeability
2BC—13 to 51 inches (32 to 130 cm); sand, rapid permeability
2C1—51 to 75 inches (130 to 190 cm); sand, rapid permeability
3C2—75 to 79 inches (190 to 200 cm); stratified sand to silt loam, moderately rapid permeability

Minor Components

• Soils that have a loamy substratum: 10 to 15 percent of the map unit

Management Considerations

Soil-related factors: Erosion hazard
Current uses: Rangeland, berry picking
Potential uses: Rangeland, berry picking

7—Cryofluvents-Spodic Dystrocryepts complex, 1 to 8 percent slopes

Elevation: 20 to 118 feet (6 to 36 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Cryofluvents and Similar Soils

Extent: 25 to 75 percent of the map unit
Landform: Drainageways
Slope shape: Linear downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 33 to 262 feet (10 to 80 m)
Parent material: Sandy and silty alluvium
Depth to bedrock (lithic): 59 to 79 inches (150 to 200 cm)
Hazard of erosion (organic mat removed): By water—moderate; by wind—slight
Runoff: Very low
Drainage class: Well drained
Flooding: Rare
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 9.4 inches (24 cm)
Ecological site: Grassy Drainage
Typical profile:
Oe—0 to 3 inches (0 to 8 cm); mucky peat, rapid permeability
C1—3 to 35 inches (8 to 90 cm); stratified fine sandy loam to silt loam, moderate permeability
C2—35 to 61 inches (90 to 156 cm); stratified loamy fine sand to fine sandy loam, moderately rapid permeability
R—61 inches (156 cm); bedrock

Spodic Dystrocryepts and Similar Soils

Extent: 10 to 50 percent of the map unit
Landform: Terraces on drainageways
Slope shape: Linear downslope; linear or concave across the slope
Slope range: 1 to 8 percent
Slope length: 82 to 656 feet (25 to 200 m)
Parent material: Loamy colluvium derived from basalt over sandy alluvium and/or sandy colluvium
Depth to bedrock (lithic): 39 to 79 inches (100 to 200 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—severe
Runoff: Very low
Drainage class: Well drained

Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 6.5 inches (17 cm)
Ecological site: Grassy Drainage
Typical profile:
Oi/A—0 to 3 inches (0 to 8 cm); mucky peat, silt loam, moderately rapid permeability
A—3 to 6 inches (8 to 16 cm); silt loam, moderately rapid permeability
Bw—6 to 13 inches (16 to 34 cm); silt loam, moderately rapid permeability
Ab—13 to 15 inches (34 to 38 cm); medial silt loam, moderately rapid permeability
BCm—15 to 20 inches (38 to 50 cm); fine sand, moderately rapid permeability
C—20 to 79 inches (50 to 200 cm); stratified fine sand to loamy very fine sand to silt loam, moderately rapid permeability
2R—79 inches (200 cm); bedrock

Minor Components

- Poorly drained soils in drainageways: 0 to 15 percent of the map unit
- Soils that are shallow to bedrock: 0 to 10 percent of the map unit

Management Considerations

Soil-related factors: Rare flooding, bouldery areas, moderate erosion hazard, frost action
Current uses: Wildlife habitat
Potential uses: Wildlife habitat

8—Dumps, landfill

Elevation: 66 to 394 feet (20 to 120 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Dumps, Landfill

Extent: 100 percent of the map unit
Landform: Plains
Slope shape: Concave or linear downslope; linear or concave across the slope
Slope range: 1 to 5 percent

Management Considerations

Soil-related factors: Fill can overlie waste material.
Current uses: Waste disposal
Potential uses: Reclaimed land

9—Einahnuhto silty clay loam-Andic Haplocryods, rubbly, complex, 1 to 8 percent slopes

Elevation: 20 to 118 feet (6 to 36 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Einahnuhto and Similar Soils

Extent: 35 to 55 percent of the map unit
Landform: Dipslopes
Slope shape: Convex downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 33 to 164 feet (10 to 50 m)
Parent material: Fine-loamy residuum derived from basalt
Depth to bedrock (lithic): 20 to 39 inches (50 to 100 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Low
Drainage class: Moderately well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 8.9 inches (23 cm)
Ecological site: Forb Tundra
Typical profile:
Oe—0 to 3 inches (0 to 7 cm); mucky peat, moderately rapid permeability
A—3 to 6 inches (7 to 14 cm); silty clay loam, moderate permeability
Bw—6 to 10 inches (14 to 25 cm); silty clay loam, moderately slow permeability
BC—10 to 20 inches (25 to 50 cm); cobbly silty clay loam, slow permeability
C—20 to 41 inches (50 to 105 cm); cobbly silt loam, moderately slow permeability
R—41 inches (105 cm); bedrock

Andic Haplocryods, Rubbly, and Similar Soils

Extent: 30 to 45 percent of the map unit
Landform: Dipslopes
Slope shape: Concave downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 98 to 262 feet (30 to 80 m)
Parent material: Coarse-loamy colluvium and/or coarse-loamy eolian deposits over residuum derived from basalt

Depth to bedrock (lithic): 20 to 39 inches (50 to 100 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 6.9 inches (17 cm)
Ecological site: Forb Tundra
Typical profile:
Oe—0 to 4 inches (0 to 10 cm); stony mucky peat, moderately rapid permeability
AE—4 to 6 inches (10 to 15 cm); very stony medial very fine sandy loam, moderate permeability
Bs—6 to 15 inches (15 to 37 cm); medial very stony fine sandy loam, moderately rapid permeability
BC—15 to 31 inches (37 to 80 cm); very stony fine sandy loam, moderately rapid permeability
2C—31 to 35 inches (80 to 90 cm); gravelly loam, moderate permeability
2R—35 inches (90 cm); bedrock

Minor Components

- Rock outcrop: 0 to 8 percent of the map unit
- Terric Cryohemists and similar soils: 0 to 2 percent of the map unit

Management Considerations

Soil-related factors: Rubbly surface, frost heave, erosion hazard
Current uses: Rangeland
Potential uses: Rangeland

10—Histic Cryaquepts-Terric Cryohemists complex, 0 to 3 percent slopes

Elevation: 10 to 30 feet (3 to 9 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Histic Cryaquepts, Sandy, and Similar Soils

Extent: 65 to 90 percent of the map unit
Landform: Lakeshores on lake plains
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Parent material: Grassy organic material over sandy alluvium and/or sandy eolian deposits
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Negligible
Drainage class: Very poorly drained
Flooding: None
Depth to high water table (approximate): 11 inches (27 cm)
Ponding: Frequent
Available water capacity (approximate): 5.4 inches (14 cm)
Ecological site: Lake Margin
Typical profile:
Oi—0 to 3 inches (0 to 7 cm); peat, rapid permeability
Oe—3 to 8 inches (7 to 20 cm); mucky peat, moderate permeability
Cg—8 to 65 inches (20 to 166 cm); sand, rapid permeability

Terric Cryohemists, Sandy, and Similar Soils

Extent: 10 to 30 percent of the map unit
Landform: Lakeshores on lake plains
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Parent material: Grassy organic material over sandy eolian deposits
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Negligible
Drainage class: Poorly drained
Flooding: None
Depth to high water table (approximate): 20 inches (50 cm)
Ponding: Frequent
Available water capacity (approximate): 16.9 inches (43 cm)
Ecological site: Lake Margin
Typical profile:
Oi—0 to 24 inches (0 to 61 cm); peat, rapid permeability
Oe—24 to 45 inches (61 to 115 cm); mucky peat, moderate permeability
Oa—45 to 52 inches (115 to 132 cm); muck, very slow permeability
Cg—52 to 65 inches (132 to 166 cm); loamy sand, moderately slow permeability

Minor Components

- Mineral soils that have less than 8 inches of organic material: 0 to 10 percent of the map unit

- Water: 0 to 25 percent

Management Considerations

Current uses: Wildlife habitat
Potential uses: Wildlife habitat

11—Histic Cryaquepts-Typic Cryaquents complex, tidal, 0 to 3 percent slopes

Elevation: 0 to 7 feet (0 to 2 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Histic Cryaquepts, Tidal, and Similar Soils

Extent: 40 to 60 percent of the map unit
Landform: Tidal flats
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Parent material: Grassy organic material over sandy marine deposits
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Negligible
Drainage class: Poorly drained
Flooding: Very frequent
Depth to high water table (approximate): 18 inches (45 cm)
Ponding: None
Available water capacity (approximate): 6.3 inches (16 cm)
Ecological site: Wet Meadow Complex
Typical profile:
Oi—0 to 3 inches (0 to 7 cm); peat, rapid permeability
Oe—3 to 8 inches (7 to 20 cm); mucky peat, moderate permeability
Cg—8 to 65 inches (20 to 166 cm); sand, very rapid permeability

Typic Cryaquents, Tidal, and Similar Soils

Extent: 40 to 60 percent of the map unit
Landform: Tidal flats
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Parent material: Sandy marine deposits
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Negligible
Drainage class: Very poorly drained
Flooding: Very frequent
Depth to high water table (approximate): 8 inches (21 cm)
Ponding: None
Available water capacity (approximate): 3.2 inches (8 cm)
Ecological site: Wet Meadow Complex
Typical profile:
Oi—0 to 2 inches (0 to 4 cm); peat, rapid permeability
C—2 to 65 inches (4 to 166 cm); sand, very rapid permeability

Management Considerations

Soil-related factors: Flooding
Current uses: Wildlife habitat
Potential uses: Wildlife habitat

12—Humic Vitricryands-Vitrandic Dystrocryepts complex, rolling

Elevation: 39 to 82 feet (12 to 25 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Humic Vitricryands and Similar Soils

Extent: 25 to 80 percent of the map unit
Landform: Strand plains
Slope shape: Linear downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 7 to 20 feet (2 to 6 m)
Parent material: Sandy and silty eolian deposits derived from scoria over sandy and silty eolian deposits
Hazard of erosion (organic mat removed): By water—slight; by wind—severe
Runoff: Low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 7.0 inches (18 cm)
Ecological site: Beach Dunes and Ridges (Old)
Typical profile:
Oi—0 to 2 inches (0 to 6 cm); peat, rapid permeability
A—2 to 5 inches (6 to 13 cm); fine sandy loam, moderately rapid permeability
Bw—5 to 15 inches (13 to 38 cm); very fine sandy loam, moderately rapid permeability

2BC—15 to 24 inches (38 to 61 cm); sandy loam, moderately rapid permeability
2C1—24 to 71 inches (61 to 180 cm); loamy sand, rapid permeability
3C2—71 to 77 inches (180 to 195 cm); silt loam, moderate permeability

Vitrandic Dystrocryepts and Similar Soils

Extent: 10 to 60 percent of the map unit
Landform: Dunes on strand plains
Slope shape: Concave or convex downslope; linear across the slope
Slope range: 1 to 16 percent
Slope length: 3 to 16 feet (1 to 5 m)
Parent material: Sandy and silty eolian deposits over sandy alluvium over scoria
Hazard of erosion (organic mat removed): By water—moderate; by wind—moderate
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 7.5 inches (19 cm)
Ecological site: Beach Dunes and Ridges (Old)
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); peat, rapid permeability
A—1 to 3 inches (3 to 8 cm); medial loamy fine sand, rapid permeability
2C—3 to 13 inches (8 to 33 cm); sand, very rapid permeability
3Bwb—13 to 34 inches (33 to 86 cm); silt loam, moderate permeability
4C1—34 to 55 inches (86 to 140 cm); loamy sand, rapid permeability
5C2—55 inches (140 cm); gravel, very rapid permeability

Minor Components

- Humic Vitricryands, sandy substratum: 0 to 20 percent of the map unit

Management Considerations

Soil-related factors: Erosion hazard
Current uses: Rangeland
Potential uses: Rangeland

13—Lithic Cryofolists-Rock outcrop complex, 4 to 16 percent slopes

Elevation: 39 to 279 feet (12 to 85 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Lithic Cryofolists and Similar Soils

Extent: 50 to 75 percent of the map unit
Landform: Lava flows
Slope shape: Linear downslope; linear across the slope
Slope range: 1 to 16 percent
Slope length: 7 to 230 feet (2 to 70 m)
Parent material: Silty organic material over basalt
Depth to bedrock (lithic): 10 to 20 inches (25 to 50 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 8.7 inches (22 cm)
Ecological site: Rubble Lava Flow
Typical profile:
Oi—0 to 2 inches (0 to 4 cm); peat, rapid permeability
Oa—2 to 18 inches (4 to 46 cm); extremely cobbly muck, very slow permeability
R—18 inches (46 cm); bedrock

Rock Outcrop

Extent: 25 to 50 percent of the map unit
Landform: Lava flows
Slope shape: Convex or concave downslope; concave or convex across the slope
Slope range: 1 to 16 percent
Ecological site: Rubble Lava Flow

Management Considerations

Soil-related factors: Shallow soils, erosion hazard
Current uses: Rangeland
Potential uses: Rangeland

14—Lithic Haplocryands, gravelly, complex, 1 to 30 percent slopes

Elevation: 118 to 197 feet (36 to 60 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Lithic Haplocryands, Gravelly, 10 to 30 Percent Slopes, and Similar Soils

Extent: 50 to 70 percent of the map unit
Landform: Hills

Position on slope: Backslopes
Slope shape: Concave or linear downslope; linear or convex across the slope
Slope range: 10 to 30 percent
Slope length: 66 to 361 feet (20 to 110 m)
Parent material: Gravelly residuum derived from tuff
Depth to bedrock (lithic): 10 to 20 inches (25 to 50 cm)
Hazard of erosion (organic mat removed): By water—severe; by wind—slight
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 3.2 inches (8 cm)
Ecological site: Crowberry (Upland)
Typical profile:
Oi—0 to 4 inches (0 to 10 cm); peat, rapid permeability
A—4 to 7 inches (10 to 17 cm); fine sandy loam, moderately rapid permeability
Bw—7 to 13 inches (17 to 34 cm); gravelly fine sandy loam, moderately rapid permeability
BC—13 to 19 inches (34 to 47 cm); gravelly fine sandy loam, moderately rapid permeability
C—19 to 21 inches (47 to 54 cm); very gravelly fine sandy loam, moderately rapid permeability
R—21 inches (54 cm); bedrock

Lithic Haplocryands, Gravelly, 1 to 8 Percent Slopes, and Similar Soils

Extent: 25 to 50 percent of the map unit
Landform: Hills
Position on slope: Shoulders, summits
Slope shape: Linear downslope; convex across the slope
Slope range: 1 to 8 percent
Slope length: 66 to 361 feet (20 to 110 m)
Parent material: Gravelly residuum derived from tuff
Depth to bedrock (lithic): 10 to 20 inches (25 to 50 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 3.1 inches (8 cm)
Ecological site: Crowberry (Upland)
Typical profile:
Oi—0 to 4 inches (0 to 10 cm); peat, rapid permeability
A—4 to 7 inches (10 to 17 cm); fine sandy loam, moderately rapid permeability
Bw—7 to 13 inches (17 to 34 cm); gravelly fine sandy loam, moderately rapid permeability
BC—13 to 19 inches (34 to 47 cm); gravelly fine sandy loam, moderately rapid permeability
C—19 to 21 inches (47 to 54 cm); very gravelly fine sandy loam, moderately rapid permeability
R—21 inches (54 cm); bedrock

Minor Components

- Rock outcrop: 5 to 10 percent of the map unit
- Polovina and similar soils: 0 to 5 percent of the map unit

Management Considerations

Soil-related factors: Steep slopes, erosion hazard, shallow soils
Current uses: Rangeland, berry picking
Potential uses: Rangeland, berry picking

15—Lithic Haplocryands, rubbly-Typic Haplocryands, moderately deep-Rock outcrop complex, 1 to 8 percent slopes

Elevation: 118 to 499 feet (36 to 152 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Lithic Haplocryands and Similar Soils

Extent: 40 to 60 percent of the map unit
Landform: Lava flows
Slope shape: Convex or linear downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 98 to 262 feet (30 to 80 m)
Parent material: Coarse-loamy eolian deposits derived from scoria and/or silty eolian deposits derived from basalt over silty residuum derived from basalt
Depth to bedrock (lithic): 10 to 20 inches (25 to 50 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None

Available water capacity (approximate): 3.3 inches (8 cm)
Ecological site: Rocky Uplands
Typical profile:
Oi—0 to 2 inches (0 to 4 cm); stony peat, rapid permeability
A—2 to 5 inches (4 to 12 cm); stony medial silt loam, moderately rapid permeability
Bw—5 to 13 inches (12 to 32 cm); medial very stony silt loam, moderately rapid permeability
2BC—13 to 19 inches (32 to 47 cm); very stony medial silt loam, moderately rapid permeability
2R—19 inches (47 cm); bedrock

Typic Haplocryands and Similar Soils

Extent: 30 to 40 percent of the map unit
Landform: Lava flows
Slope shape: Convex or linear downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 394 to 426 feet (120 to 130 m)
Parent material: Silty eolian deposits derived from basalt and/or coarse-loamy eolian deposits derived from scoria over silty residuum derived from basalt
Depth to bedrock (lithic): 20 to 39 inches (50 to 100 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 5.4 inches (14 cm)
Ecological site: Rocky Uplands
Typical profile:
Oe—0 to 3 inches (0 to 7 cm); stony mucky peat, moderate permeability
A—3 to 4 inches (7 to 10 cm); medial very stony silt loam, moderately rapid permeability
Bw—4 to 12 inches (10 to 30 cm); medial very stony silt loam, moderately rapid permeability
BC—12 to 35 inches (30 to 90 cm); cobbly medial silt loam, moderate permeability
2C—35 to 38 inches (90 to 97 cm); medial very gravelly silt loam, moderate permeability
2R—38 inches (97 cm); bedrock

Rock Outcrop

Extent: 20 to 40 percent of the map unit
Landform: Lava flows
Slope shape: Convex downslope; linear across the slope
Slope range: 1 to 8 percent
Ecological site: Rocky Uplands

Minor Components

• Soils that have slopes of 10 to 30 percent: 5 to 10 percent of the map unit

Management Considerations

Soil-related factors: Shallow soils, erosion hazard, stony surface
Current uses: Rangeland, recreation
Potential uses: Rangeland, recreation

16—Lukanin sand, 1 to 60 percent slopes

Elevation: 0 to 118 feet (0 to 36 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Lukanin and Similar Soils

Extent: 70 to 90 percent of the map unit
Landform: Dunes
Slope shape: Concave or convex downslope; linear across the slope
Slope range: 1 to 60 percent
Slope length: 16 to 164 feet (5 to 50 m)
Parent material: Eolian sands
Hazard of erosion (organic mat removed): By water—severe; by wind—severe
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 3.0 inches (8 cm)
Ecological site: Beach Dunes and Ridges
Typical profile:
Oi—0 to 1 inch (0 to 2 cm); peat, rapid permeability
A—1 to 3 inches (2 to 7 cm); sand, rapid permeability
C—3 to 79 inches (7 to 200 cm); sand, very rapid permeability

Minor Components

• Typic Cryaquents, sandy, and similar soils: 10 to 20 percent of the map unit
• Histic Cryaquepts, sandy, and similar soils: 0 to 10 percent of the map unit

Management Considerations

Soil-related factors: Steep slopes, erosion hazard
Current uses: Recreation, wildlife habitat
Potential uses: Recreation, wildlife habitat

17—Pits, quarry

Elevation: 131 to 459 feet (40 to 140 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Pits, Quarry

Extent: 100 percent of the map unit
Landform: Hills, lava flows
Slope shape: Concave or linear downslope; linear or concave across the slope
Slope range: 1 to 20 percent

Management Considerations

Soil-related factors: Bare rock exposed at surface, steep slopes
Current uses: Mining for rock
Potential uses: Reclaimed land

18—Polovina fine sandy loam, 0 to 3 percent slopes

Elevation: 39 to 59 feet (12 to 18 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Polovina and Similar Soils

Extent: 60 to 90 percent of the map unit
Landform: Plains
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Slope length: 656 to 984 feet (200 to 300 m)
Parent material: Sandy eolian deposits and/or coarse-loamy eolian deposits over residuum derived from basalt
Depth to bedrock (lithic): 39 to 59 inches (100 to 150 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 9.8 inches (25 cm)
Ecological site: Forb Tundra
Typical profile:
Oe—0 to 2 inches (0 to 4 cm); mucky peat, moderate permeability
A—2 to 4 inches (4 to 9 cm); fine sandy loam, moderately rapid permeability
Bw—4 to 19 inches (9 to 49 cm); sandy loam, moderately rapid permeability
2BC—19 to 37 inches (49 to 95 cm); medial silt loam, moderately rapid permeability
3C—37 to 55 inches (95 to 140 cm); gravelly silt loam, moderately rapid permeability
3R—55 inches (140 cm); bedrock

Minor Components

- Polovina family, moderately deep, and similar soils: 10 to 25 percent of the map unit
- Soils that have a cemented pan: 0 to 10 percent of the map unit

Management Considerations

Soil-related factors: Moderate erosion hazard
Current uses: Rangeland
Potential uses: Rangeland

19—Polovina fine sandy loam, 1 to 8 percent slopes

Elevation: 39 to 118 feet (12 to 36 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Polovina and Similar Soils

Extent: 60 to 85 percent of the map unit
Landform: Dipslopes
Position on slope: Backslopes
Slope shape: Linear downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 131 to 656 feet (40 to 200 m)
Parent material: Coarse-loamy eolian deposits and/or sandy eolian deposits over residuum derived from basalt
Depth to bedrock (lithic): 39 to 59 inches (100 to 150 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)

Ponding: None
Available water capacity (approximate): 10.8 inches (27 cm)
Ecological site: Forb Tundra
Typical profile:
Oi—0 to 2 inches (0 to 5 cm); peat, rapid permeability
A—2 to 4 inches (5 to 10 cm); fine sandy loam, moderately rapid permeability
Bw—4 to 19 inches (10 to 48 cm); medial very fine sandy loam, moderately rapid permeability
BC—19 to 34 inches (48 to 86 cm); medial very fine sandy loam, moderately rapid permeability
2C—34 to 55 inches (86 to 140 cm); cobbly silt loam, moderately rapid permeability
2R—55 inches (140 cm); bedrock

Minor Components

• Soils that have a sandy substratum: 10 to 15 percent of the map unit

Management Considerations

Soil-related factors: Erosion hazard
Current uses: Rangeland, recreation
Potential uses: Rangeland, recreation

20—Polovina family, moderately deep, 1 to 8 percent slopes

Elevation: 197 to 239 feet (60 to 73 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Polovina Family and Similar Soils

Extent: 60 to 75 percent of the map unit
Landform: Hills
Position on slope: Summits, shoulders
Slope shape: Linear or convex downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 66 to 394 feet (20 to 120 m)
Parent material: Coarse-loamy eolian deposits over sandy eolian deposits and/or gravelly residuum derived from basalt
Depth to bedrock (lithic): 20 to 39 inches (50 to 99 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 4.6 inches (12 cm)
Ecological site: Dwarf Shrub Tundra
Typical profile:
Oi—0 to 3 inches (0 to 7 cm); peat, rapid permeability
A—3 to 7 inches (7 to 18 cm); medial fine sandy loam, moderately rapid permeability
Bw—7 to 14 inches (18 to 36 cm); loamy fine sand, medial fine sandy loam, moderately rapid permeability
BC—14 to 22 inches (36 to 56 cm); loamy sand, sandy loam, moderately rapid permeability
2C1—22 to 26 inches (56 to 67 cm); sand, rapid permeability
3C2—26 to 31 inches (67 to 79 cm); loamy sand, rapid permeability
4C3—31 to 35 inches (79 to 89 cm); gravelly loam, moderately slow permeability
4R—35 inches (89 cm); bedrock

Minor Components

• Soils that are shallow to bedrock: 5 to 10 percent of the map unit
• Soils that have a sandy substratum: 10 to 15 percent of the map unit
• Rock outcrop: 5 to 10 percent of the map unit

Management Considerations

Soil-related factors: Moderate erosion hazard
Current uses: Wildlife habitat
Potential uses: Wildlife habitat

21—Polovina family, very deep, 4 to 16 percent slopes

Elevation: 30 to 59 feet (9 to 18 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Polovina Family and Similar Soils

Extent: 70 to 90 percent of the map unit
Landform: Hills
Position on slope: Backslopes, footslopes
Slope shape: Convex or linear downslope; linear across the slope
Slope range: 4 to 16 percent
Slope length: 66 to 328 feet (20 to 100 m)
Parent material: Coarse-loamy eolian deposits and/or sandy eolian deposits over residuum derived from basalt
Depth to bedrock (lithic): 59 to 79 inches (150 to 200 cm)

Hazard of erosion (organic mat removed): By water—moderate; by wind—moderate
Runoff: Low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 8.7 inches (22 cm)
Ecological site: Herbaceous Hillsides
Typical profile:
Oi—0 to 4 inches (0 to 9 cm); peat, rapid permeability
A—4 to 12 inches (9 to 30 cm); medial sandy loam, moderately rapid permeability
Bw—12 to 26 inches (30 to 65 cm); medial sandy loam, moderately rapid permeability
2BC—26 to 63 inches (65 to 160 cm); cobbly sandy loam, moderately rapid permeability
3C—63 to 73 inches (160 to 185 cm); very gravelly silt loam, moderate permeability
3R—73 inches (185 cm); bedrock

Minor Components

• Soils that have a sandy substratum: 0 to 30 percent of the map unit

Management Considerations

Soil-related factors: Erosion hazard, steep slopes
Current uses: Rangeland
Potential uses: Rangeland

22—Polovina family, very deep, 10 to 30 percent slopes

Elevation: 59 to 118 feet (18 to 36 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Polovina Family and Similar Soils

Extent: 80 to 90 percent of the map unit
Landform: Hills
Position on slope: Backslopes
Slope shape: Concave downslope; linear across the slope
Slope range: 10 to 30 percent
Slope length: 66 to 131 feet (20 to 40 m)
Parent material: Coarse-loamy eolian deposits and/or sandy eolian deposits over residuum derived from basalt
Depth to bedrock (lithic): 59 to 79 inches (150 to 200 cm)
Hazard of erosion (organic mat removed): By water—severe; by wind—moderate
Runoff: Low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 8.7 inches (22 cm)
Ecological site: Herbaceous Hillsides
Typical profile:
Oi—0 to 4 inches (0 to 9 cm); peat, rapid permeability
A—4 to 12 inches (9 to 30 cm); medial sandy loam, moderately rapid permeability
Bw—12 to 26 inches (30 to 65 cm); medial sandy loam, moderately rapid permeability
2BC—26 to 63 inches (65 to 160 cm); cobbly sandy loam, moderately rapid permeability
3C—63 to 73 inches (160 to 185 cm); very gravelly silt loam, moderate permeability
3R—73 inches (185 cm); bedrock

Minor Components

• Soils that have a sandy substratum: 0 to 20 percent of the map unit

Management Considerations

Soil-related factors: Erosion hazard, steep slopes
Current uses: Wildlife habitat
Potential uses: Wildlife habitat

23—Rock outcrop, basalt

Elevation: 0 to 407 feet (0 to 124 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Rock Outcrop

Extent: 100 percent of the map unit
Landform: Sea cliffs
Slope shape: Linear downslope; linear across the slope
Slope range: 40 to 200 percent
Ecological site: Sea Cliff

Management Considerations

Site-related factors: Steep rock faces

Current uses: Bird habitat
Potential uses: Bird habitat

24—Tsammana sand, 1 to 8 percent slopes

Elevation: 20 to 82 feet (6 to 25 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Tsammana and Similar Soils

Extent: 65 to 85 percent of the map unit
Landform: Dipslopes
Position on slope: Footslopes
Slope shape: Linear downslope; concave or linear across the slope
Slope range: 1 to 8 percent
Slope length: 197 to 492 feet (60 to 150 m)
Parent material: Sandy eolian deposits over residuum
Depth to bedrock (lithic): 39 to 59 inches (100 to 150 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—severe
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 3.0 inches (8 cm)
Ecological site: Forb Tundra (Coastal)
Typical profile:
Oe—0 to 1 inch (0 to 3 cm); peat, rapid permeability
A1—1 to 3 inches (3 to 8 cm); sand, rapid permeability
A2—3 to 5 inches (8 to 12 cm); sandy loam, moderately rapid permeability
Bw—5 to 15 inches (12 to 39 cm); loamy fine sand, medial fine sandy loam, moderately rapid permeability
2BC—15 to 34 inches (39 to 86 cm); very cobbly loamy sand, rapid permeability
2C—34 to 56 inches (86 to 143 cm); very cobbly sand, rapid permeability
2R—56 inches (143 cm); bedrock

Minor Components

- Soils that are moderately deep: 10 to 15 percent of the map unit
- Soils that have a sandy substratum: 5 to 15 percent of the map unit
- Rock outcrop: 0 to 10 percent of the map unit

Management Considerations

Soil-related factors: Cobbly or stony substratum, moderate erosion hazard
Current uses: Rangeland, recreation
Potential uses: Rangeland, recreation

25—Tsammana sand-Lithic Cryorthents complex, 0 to 3 percent slopes

Elevation: 7 to 39 feet (2 to 12 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Tsammana and Similar Soils

Extent: 20 to 85 percent of the map unit
Landform: Beach terraces
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Slope length: 66 to 328 feet (20 to 100 m)
Parent material: Sandy eolian deposits over sandy marine deposits and/or residuum
Depth to bedrock (lithic): 39 to 59 inches (100 to 150 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—severe
Runoff: Negligible
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 3.0 inches (8 cm)
Ecological site: Forb Tundra (Coastal)
Typical profile:
Oe—0 to 1 inch (0 to 3 cm); peat, rapid permeability
A1—1 to 3 inches (3 to 8 cm); sand, rapid permeability
A2—3 to 5 inches (8 to 12 cm); sandy loam, moderately rapid permeability
Bw—5 to 15 inches (12 to 39 cm); loamy fine sand, medial fine sandy loam, moderately rapid permeability
2BC—15 to 34 inches (39 to 86 cm); very stony loamy sand, rapid permeability
2C—34 to 56 inches (86 to 143 cm); very stony sand, rapid permeability
2R—56 inches (143 cm); bedrock

Lithic Cryorthents and Similar Soils

Extent: 10 to 60 percent of the map unit
Landform: Beach terraces
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Slope length: 33 to 98 feet (10 to 30 m)
Parent material: Sandy and silty eolian deposits over residuum
Depth to bedrock (lithic): 12 to 20 inches (30 to 50 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Negligible
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 1.0 inches (3 cm)
Ecological site: Forb Tundra (Coastal)
Typical profile:
Oe—0 to 2 inches (0 to 5 cm); mucky peat, rapid permeability
A—2 to 5 inches (5 to 12 cm); stony loamy sand, rapid permeability
C—5 to 17 inches (12 to 43 cm); very stony loamy sand, rapid permeability
R—17 inches (43 cm); bedrock

Minor Components

• Soils that are moderately deep to bedrock: 0 to 15 percent of the map unit
• Soils that have a cemented pan: 5 to 15 percent of the map unit

Management Considerations

Soil-related factors: Shallow soils, bouldery substratum, erosion hazard
Current uses: Rangeland
Potential uses: Rangeland

26—Typic Cryaquents, sandy, 0 to 3 percent slopes

Elevation: 10 to 23 feet (3 to 7 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Typic Cryaquents and Similar Soils

Extent: 85 to 90 percent of the map unit
Landform: Lake plains
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Parent material: Sandy alluvium and/or sandy colluvium
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Negligible
Drainage class: Very poorly drained
Flooding: None
Depth to high water table (approximate): 0 inches (0 cm)
Ponding: Frequent
Available water capacity (approximate): 3.2 inches (8 cm)
Ecological site: Wet Lake Bed (Juncus)
Typical profile:
Oi—0 to 3 inches (0 to 7 cm); peat, rapid permeability
Cg1—3 to 16 inches (7 to 41 cm); sand, rapid permeability
Cg2—16 to 65 inches (41 to 166 cm); sand, rapid permeability

Minor Components

• Histic Cryaquepts, sandy, and similar soils: 10 to 15 percent of the map unit

Management Considerations

Soil-related factors: Ponding
Current uses: Wildlife habitat
Potential uses: Wildlife habitat

27—Typic Cryaquents, mucky-Terric Cryohemists complex, 0 to 3 percent slopes

Elevation: 3 to 33 feet (1 to 10 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Typic Cryaquents and Similar Soils

Extent: 35 to 60 percent of the map unit
Landform: Lake plains
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Slope length: 16 to 49 feet (5 to 15 m)
Parent material: Silty lacustrine deposits
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Negligible
Drainage class: Poorly drained

Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: Frequent
Available water capacity (approximate): 15.5 inches (39 cm)
Ecological site: Sedge Meadow (Wet)
Typical profile:
Oa—0 to 7 inches (0 to 19 cm); muck, very slow permeability
Cg—7 to 65 inches (19 to 166 cm); silt loam, moderate permeability

Terric Cryohemists, Loamy, and Similar Soils

Extent: 40 to 60 percent of the map unit
Landform: Lake plains
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 3 percent
Slope length: 16 to 33 feet (5 to 10 m)
Parent material: Grassy organic material over silty lacustrine deposits
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Negligible
Drainage class: Poorly drained
Flooding: None
Depth to high water table (approximate): 0 inches (0 cm)
Ponding: Frequent
Available water capacity (approximate): 18.3 inches (46 cm)
Ecological site: Sedge Meadow (Wet)
Typical profile:
Oe—0 to 18 inches (0 to 45 cm); mucky peat, moderate permeability
Oi—18 to 25 inches (45 to 63 cm); peat, rapid permeability
2C—25 to 65 inches (63 to 166 cm); silt loam, moderate permeability

Minor Components

- Water: 0 to 15 percent of the map unit

Management Considerations

Current uses: Wildlife habitat
Potential uses: Wildlife habitat

28—Typic Dystrocryepts complex, undulating

Elevation: 7 to 82 feet (2 to 25 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Typic Dystrocryepts, Deep, and Similar Soils

Extent: 30 to 50 percent of the map unit
Landform: Plains
Slope shape: Convex or concave downslope; concave or convex across the slope
Slope range: 1 to 8 percent
Slope length: 66 to 213 feet (20 to 65 m)
Parent material: Sandy and silty alluvium and/or sandy and silty eolian deposits
Depth to bedrock (lithic): 39 to 59 inches (100 to 150 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 4.1 inches (10 cm)
Ecological site: Forb/Sedge Tundra
Typical profile:
Oe—0 to 2 inches (0 to 5 cm); mucky peat, moderate permeability
A—2 to 7 inches (5 to 18 cm); sandy loam, moderately rapid permeability
Bw—7 to 15 inches (18 to 37 cm); sand, loamy sand, moderately rapid permeability
BC—15 to 31 inches (37 to 78 cm); sand, sandy loam, moderately rapid permeability
C—31 to 45 inches (78 to 114 cm); sand, sandy loam, moderately rapid permeability
2R—45 inches (114 cm); bedrock

Typic Dystrocryepts, Moderately Deep, and Similar Soils

Extent: 30 to 40 percent of the map unit
Landform: Plains
Slope shape: Concave or convex downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 66 to 213 feet (20 to 65 m)
Parent material: Loamy eolian deposits over silty residuum
Depth to bedrock (lithic): 20 to 39 inches (50 to 100 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)

Ponding: None
Available water capacity (approximate): 5.3 inches (14 cm)
Ecological site: Forb/Sedge Tundra
Typical profile:
Oi—0 to 2 inches (0 to 4 cm); peat, rapid permeability
A—2 to 4 inches (4 to 9 cm); fine sandy loam, moderately rapid permeability
Bw—4 to 19 inches (9 to 49 cm); sandy loam, moderately rapid permeability
2C—19 to 33 inches (49 to 84 cm); gravelly silt loam, moderately rapid permeability
2R—33 inches (84 cm); bedrock

Minor Components

• Soils that are somewhat poorly drained: 0 to 10 percent of the map unit

Management Considerations

Soil-related factors: Undulating surface
Current uses: Rangeland
Potential uses: Rangeland

29—Typic Eutrocryepts, 4 to 16 percent slopes

Elevation: 59 to 197 feet (18 to 60 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Typic Eutrocryepts and Similar Soils

Extent: 90 percent of the map unit
Landform: Hills
Slope shape: Linear downslope; convex across the slope
Slope range: 4 to 16 percent
Slope length: 262 to 984 feet (80 to 300 m)
Parent material: Sandy eolian deposits over silty eolian deposits and/or gravelly residuum
Depth to bedrock (lithic): 40 to 59 inches (102 to 150 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—severe
Runoff: Very low
Drainage class: Moderately well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 5.7 inches (14 cm)
Ecological site: Moss/Willow (Coastal)
Typical profile:
Oi—0 to 2 inches (0 to 6 cm); peat, rapid permeability
A1—2 to 5 inches (6 to 12 cm); sand, rapid permeability
2A2—5 to 7 inches (12 to 17 cm); fine sandy loam, rapid permeability
3Bw—7 to 43 inches (17 to 110 cm); very gravelly silt loam, moderate permeability
3C—43 to 45 inches (110 to 115 cm); extremely gravelly silt loam, moderate permeability
3R—45 inches (115 cm); bedrock

Minor Components

• Soils that are moderately deep to bedrock: 10 percent of the map unit

Management Considerations

Soil-related factors: Erosion hazard, steep slopes
Current uses: Rangeland
Potential uses: Rangeland

30—Typic Haplocryands, deep, 1 to 8 percent slopes

Elevation: 118 to 400 feet (36 to 122 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Typic Haplocryands and Similar Soils

Extent: 40 to 80 percent of the map unit
Landform: Depressions on lava flows
Slope shape: Linear downslope; linear or concave across the slope
Slope range: 1 to 8 percent
Slope length: 98 to 394 feet (30 to 120 m)
Parent material: Silty colluvium derived from basalt and/or silty eolian deposits derived from basalt
Depth to bedrock (lithic): 39 to 59 inches (100 to 150 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—severe
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 15.3 inches (39 cm)
Ecological site: Forb Tundra

Typical profile:
Oe—0 to 2 inches (0 to 6 cm); stony peat, moderate permeability
A—2 to 8 inches (6 to 21 cm); stony silt loam, moderately rapid permeability
Bw—8 to 21 inches (21 to 54 cm); very stony silt loam, moderately rapid permeability
BC—21 to 39 inches (54 to 100 cm); very stony silt loam, moderate permeability
C—39 to 44 inches (100 to 113 cm); very stony silt loam, moderate permeability
2R—44 inches (113 cm); bedrock

Minor Components

- Moderately deep soils: 5 to 15 percent of the map unit
- Rubble land, boulders: 0 to 15 percent of the map unit

Management Considerations

Soil-related factors: Bouldery areas
Current uses: Rangeland
Potential uses: Rangeland

31—Typic Haplocryands, moderately deep-Lithic Haplocryands, rubbly, complex, 1 to 8 percent slopes

Elevation: 118 to 499 feet (36 to 152 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Typic Haplocryands and Similar Soils

Extent: 45 to 55 percent of the map unit
Landform: Lava flows
Slope shape: Concave or linear downslope; linear or concave across the slope
Slope range: 1 to 8 percent
Slope length: 164 to 328 feet (50 to 100 m)
Parent material: Coarse-loamy eolian deposits derived from scoria and/or silty eolian deposits derived from basalt over silty residuum derived from basalt
Depth to bedrock (lithic): 20 to 39 inches (50 to 100 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Medium
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 4.3 inches (11 cm)
Ecological site: Rocky Shrub Tundra
Typical profile:
Oe—0 to 4 inches (0 to 9 cm); stony mucky peat, moderate permeability
A—4 to 9 inches (9 to 24 cm); medial extremely stony silt loam, moderately rapid permeability
Bw—9 to 14 inches (24 to 36 cm); medial extremely stony silt loam, moderately rapid permeability
BC—14 to 19 inches (36 to 49 cm); medial stony silt loam, moderately rapid permeability
2C—19 to 28 inches (49 to 71 cm); medial very gravelly very fine sandy loam, moderate permeability
2R—28 inches (71 cm); bedrock

Lithic Haplocryands and Similar Soils

Extent: 35 to 50 percent of the map unit
Landform: Lava flows
Slope shape: Linear or concave downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 98 to 197 feet (30 to 60 m)
Parent material: Silty eolian deposits derived from basalt and/or coarse-loamy eolian deposits derived from scoria over silty residuum derived from basalt
Depth to bedrock (lithic): 10 to 20 inches (25 to 50 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—slight
Runoff: Medium
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 3.6 inches (9 cm)
Ecological site: Rocky Shrub Tundra
Typical profile:
Oi—0 to 2 inches (0 to 5 cm); very stony peat, rapid permeability
A—2 to 5 inches (5 to 13 cm); very stony silt loam, moderately rapid permeability
Bw—5 to 12 inches (13 to 30 cm); very stony silt loam, moderately rapid permeability
BC—12 to 19 inches (30 to 49 cm); stony silt loam, moderately rapid permeability
R—19 inches (49 cm); bedrock

Minor Components

- Soils that are somewhat poorly drained: 5 to 10 percent of the map unit
- Rock outcrop: 0 to 10 percent of the map unit

Management Considerations

Soil-related factors: Erosion hazard, very stony surface
Current uses: Rangeland, wildlife habitat
Potential uses: Rangeland, wildlife habitat

32—Typic Vitricryands, 4 to 75 percent slopes

Elevation: 118 to 659 feet (36 to 201 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Typic Vitricryands and Similar Soils

Extent: 90 percent of the map unit
Landform: Solifluction lobes on volcanic cones, volcanic cones
Position on slope: Footslopes, backslopes, shoulders
Slope shape: Convex or linear downslope; linear or convex across the slope
Slope range: 4 to 75 percent
Slope length: 131 to 492 feet (40 to 150 m)
Parent material: Gravelly tephra over scoria
Hazard of erosion (organic mat removed): By water—severe; by wind—slight
Runoff: Negligible
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 3.7 inches (9 cm)
Ecological site: Rocky Volcanic Cone
Typical profile:
Oi—0 to 2 inches (0 to 5 cm); peat, rapid permeability
A—2 to 7 inches (5 to 19 cm); very cobbly silt loam, rapid permeability
Bw—7 to 17 inches (19 to 42 cm); very gravelly silt loam, rapid permeability
BC—17 to 24 inches (42 to 62 cm); very gravelly fine sandy loam, rapid permeability
2C—24 to 65 inches (62 to 166 cm); gravel, very rapid permeability

Minor Components

- Cinder land: 10 percent of the map unit

Management Considerations

Soil-related factors: Steep slopes, erosion hazard
Current uses: Rangeland, scoria
Potential uses: Rangeland, scoria

33—Typic Vitricryands, 45 to 70 percent slopes

Elevation: 118 to 299 feet (36 to 91 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Typic Vitricryands and Similar Soils

Extent: 85 percent of the map unit
Landform: Volcanic cones
Position on slope: Backslopes
Slope shape: Linear downslope; concave across the slope
Slope range: 45 to 70 percent
Slope length: 131 to 262 feet (40 to 80 m)
Parent material: Gravelly tephra over scoria
Hazard of erosion (organic mat removed): By water—severe; by wind—slight
Runoff: Negligible
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 2.5 inches (6 cm)
Ecological site: Crowberry (Upland)
Typical profile:
Oi—0 to 1 inch (0 to 3 cm); peat, rapid permeability
A—1 to 12 inches (3 to 30 cm); extremely gravelly silt loam, very rapid permeability
BC—12 to 27 inches (30 to 68 cm); very gravelly silt loam, rapid permeability
2C—27 to 65 inches (68 to 166 cm); gravel, very rapid permeability

Minor Components

- Rock outcrop: 15 percent of the map unit

Management Considerations

Soil-related factors: Steep slopes, erosion hazard
Current uses: Wildlife habitat
Potential uses: Wildlife habitat

34—Urban land

Elevation: 3 to 131 feet (1 to 40 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)

Frost-free period: 80 to 120 days

Urban Land

Extent: 100 percent of the map unit
Landform: Hills, plains
Slope shape: Linear downslope; linear across the slope
Slope range: 0 to 14 percent

Management Considerations

Site-related factors: Variable thickness of fill, leveled surfaces
Current uses: Sites for homes and commercial buildings, industrial areas
Potential uses: Sites for homes and commercial buildings, industrial areas

35—Zapadni fine sandy loam, 1 to 8 percent slopes

Elevation: 59 to 118 feet (18 to 36 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Zapadni and Similar Soils

Extent: 75 to 90 percent of the map unit
Landform: Strand plains on escarpments
Position on slope: Toeslopes
Slope shape: Concave downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 131 to 656 feet (40 to 200 m)
Parent material: Sandy and silty colluvium and/or sandy and silty eolian deposits over sandy alluvium
Depth to bedrock (lithic): 59 to 79 inches (150 to 200 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Very low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 4.8 inches (12 cm)
Ecological site: Forb/Sedge Tundra
Typical profile:
Oi—0 to 2 inches (0 to 5 cm); peat, rapid permeability
AE—2 to 6 inches (5 to 14 cm); fine sandy loam, moderately rapid permeability
Bs—6 to 10 inches (14 to 25 cm); fine sandy loam, moderately rapid permeability
Bw—10 to 17 inches (25 to 43 cm); loamy sand, rapid permeability
2BC—17 to 30 inches (43 to 75 cm); sand, rapid permeability
2C—30 to 71 inches (75 to 180 cm); sand, rapid permeability
3R—71 inches (180 cm); bedrock

Minor Components

• Soils that have slopes of more than 25 percent: 5 to 20 percent of the map unit
• Soils that have a cemented pan: 5 to 10 percent of the map unit

Management Considerations

Soil-related factors: Steep slopes
Current uses: Rangeland
Potential uses: Rangeland

36—Zolotoi complex, 1 to 8 percent slopes

Elevation: 39 to 239 feet (12 to 73 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Zolotoi Silt Loam and Similar Soils

Extent: 50 to 75 percent of the map unit
Landform: Hummocks on dipslopes
Position on slope: Backslopes
Slope shape: Linear downslope; concave or linear across the slope
Slope range: 1 to 8 percent
Slope length: 197 to 1,640 feet (60 to 500 m)
Parent material: Silty tephra over fine-loamy residuum derived from basalt
Depth to bedrock (lithic): 39 to 59 inches (99 to 150 cm)
Hazard of erosion (organic mat removed): By water—moderate; by wind—severe
Runoff: Low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 9.1 inches (23 cm)
Ecological site: Crowberry (Lowland)
Typical profile:
Oe—0 to 2 inches (0 to 6 cm); stony mucky peat, moderate permeability

A—2 to 5 inches (6 to 13 cm); stony medial silt loam, moderately rapid permeability
Bw—5 to 18 inches (13 to 46 cm); medial silt loam, moderately rapid permeability
2C1—18 to 21 inches (46 to 53 cm); medial very fine sandy loam, moderately rapid permeability
3C2—21 to 42 inches (53 to 106 cm); medial stony loam, moderately slow permeability
3R—42 inches (106 cm); bedrock

Zolotoi Silt Loam, Very Stony, and Similar Soils

Extent: 25 to 45 percent of the map unit
Landform: Dipslopes
Slope shape: Linear downslope; concave or linear across the slope
Slope range: 1 to 8 percent
Slope length: 197 to 1,640 feet (60 to 500 m)
Parent material: Silty tephra over fine-loamy residuum
Depth to bedrock (lithic): 20 to 39 inches (50 to 100 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—severe
Runoff: Low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 7.9 inches (20 cm)
Ecological site: Crowberry (Lowland)
Typical profile:
Oe—0 to 2 inches (0 to 6 cm); stony mucky peat, moderate permeability
A—2 to 5 inches (6 to 13 cm); very stony silt loam, moderately rapid permeability
Bw—5 to 18 inches (13 to 46 cm); medial silt loam, moderately rapid permeability
2C1—18 to 21 inches (46 to 53 cm); medial very fine sandy loam, moderately rapid permeability
3C2—21 to 29 inches (53 to 73 cm); medial stony loam, moderately slow permeability
3R—29 inches (73 cm); bedrock

Minor Components

- Soils that are shallow to bedrock: 5 to 15 percent of the map unit
- Soils that are somewhat poorly drained: 5 to 15 percent of the map unit

Management Considerations

Soil-related factors: Frost heave, erosion hazard
Current uses: Rangeland, berry picking
Potential uses: Rangeland, berry picking

37—Zolotoi family-Einahnuhto complex, 1 to 8 percent slopes

Elevation: 59 to 197 feet (18 to 60 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Zolotoi Family and Similar Soils

Extent: 50 to 70 percent of the map unit
Landform: Dipslopes
Slope shape: Linear downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 328 to 984 feet (100 to 300 m)
Parent material: Silty tephra over sandy eolian deposits over loamy residuum
Depth to bedrock (lithic): 35 to 59 inches (90 to 150 cm)
Hazard of erosion (organic mat removed): By water—slight; by wind—moderate
Runoff: Low
Drainage class: Well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 9.6 inches (24 cm)
Ecological site: Sedge Meadow
Typical profile:
Oe—0 to 2 inches (0 to 5 cm); peat, moderate permeability
A—2 to 6 inches (5 to 16 cm); very cobbly medial silt loam, moderately rapid permeability
Bw—6 to 26 inches (16 to 65 cm); medial silt loam, moderately rapid permeability
2C1—26 to 28 inches (65 to 71 cm); stratified loamy sand to medial silt loam, rapid permeability
3C2—28 to 36 inches (71 to 92 cm); very gravelly loam, moderately slow permeability
3R—36 inches (92 cm); bedrock

Einahnuhto Silty Clay Loam and Similar Soils

Extent: 30 to 50 percent of the map unit
Landform: Dipslopes
Slope shape: Linear downslope; linear across the slope
Slope range: 1 to 8 percent
Slope length: 230 to 328 feet (70 to 100 m)
Parent material: Fine-loamy residuum derived from basalt
Depth to bedrock (lithic): 20 to 39 inches (50 to 100 cm)

Hazard of erosion (organic mat removed): By water—moderate; by wind—slight
Runoff: Medium
Drainage class: Moderately well drained
Flooding: None
Depth to high water table (approximate): More than 72 inches (176 cm)
Ponding: None
Available water capacity (approximate): 5.8 inches (15 cm)
Ecological site: Sedge Meadow
Typical profile:
Oe—0 to 2 inches (0 to 5 cm); mucky peat, moderate permeability
A—2 to 8 inches (5 to 21 cm); silty clay loam, moderately rapid permeability
Bw—8 to 15 inches (21 to 37 cm); silty clay loam, moderately slow permeability
BC—15 to 24 inches (37 to 60 cm); loam, moderately slow permeability
C—24 to 35 inches (60 to 90 cm); gravelly loam, moderately slow permeability
R—35 inches (90 cm); bedrock

Management Considerations

Soil-related factors: Erosion hazard
Current uses: Rangeland
Potential uses: Rangeland

38—Water

Elevation: 0 to 984 feet (0 to 300 m)
Mean annual precipitation: 19 to 28 inches (48 to 71 cm)
Frost-free period: 80 to 120 days

Water

Extent: 100 percent of the map unit
Landform: Lakes, lagoons
Ecological site: Lake, Ephemeral Lake, Lagoon

Management Considerations

Current uses: Water source, recreation, wildlife habitat
Potential uses: Water source, recreation, wildlife habitat

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for rangeland and as sites for buildings, sanitary facilities, roads, and recreational facilities. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or unstable soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, and trails.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. Other tables indicate the suitability of the soils for use as source materials. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited, slightly limited, somewhat limited,* and *very limited*. The suitability ratings are expressed as *well suited, moderately well suited, poorly suited,* and *unsuited* or as *good, fair,* and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. The numerical ratings, as they relate to each specific interpretation, are explained in the sections that follow.

Recreation

The soils of the survey area are rated in table 5 according to limitations that affect their suitability for foot trails and ATV trails. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation

procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area, and its scenic quality and vegetation.

The information in table 5 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, sanitary facilities, and water management.

Foot and ATV trails for hiking, horseback riding, and ATV use should require little or no slope modification and site preparation through cutting and filling. These trails are not covered with surfacing material or vegetation. The ratings are based on the soil properties that affect trafficability, erodibility, dustiness, and the ease of revegetation. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Engineering

This section provides information for planning land uses related to urban development. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, and construction materials. The ratings are based on observed performance of the soils and on the estimates given under the heading “Soil Properties.”

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet (1.5 to 2.1 meters). Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet (1.5 to 2.1 meters) of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Tables 6 and 7 show the degree and kind of soil limitations that affect structures and site improvements, including dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

The ratings in the tables are both verbal and

numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet (0.6 meter) or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet (2.1 meters). The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet (0.6 meter) or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet (1.5 or 1.8 meters) for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is

established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

Sanitary Facilities

Tables 8 and 9 show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Slightly limited* indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 48 and 72 inches (122 and 183 cm) is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet (1.2 meters) below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches (5.1 cm) per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches (102 cm), if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet (0.6 meter) thick is placed over the landfill. The ratings in the table are based on soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding,

texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet (1.8 meters). For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet (0.6 meter) thick is placed over the completed landfill. The ratings in the table are based on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Construction Materials

Tables 10 and 11 give information about the soils as potential sources of gravel, sand, topsoil, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

In table 10, the soils are rated as a *probable* or *improbable* source of sand and gravel. A rating of *probable* means that the source material is likely to be in or below the soil. The numerical ratings in these columns indicate the degree of probability. The number 0.00 indicates that the soil is an improbable source. A number between 0.00 and 1.00 indicates the degree to which the soil is a probable source of sand or gravel. “Gravel source” or “Sand source” indicates that the soil is a source of the specified material.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 10, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the lowest layer of the soil contains sand or gravel, the soil is rated as a probable source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

In table 11, the soils are rated *good, fair,* or *poor* as potential sources of topsoil and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of topsoil or roadfill. The lower the number, the greater the limitation.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches (102 cm) of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet (1.8 meters) high and less exacting in design than higher embankments.

The ratings are for the whole soil, from the surface to a depth of about 5 feet (1.5 meters). It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential). Susceptibility to frost action is also considered. The soils are rated based on the most limiting layers. Often a soil will have finer textured upper layers that are affected by frost action, while coarser textured lower layers in the same soil may not be affected.

Rangeland Management

Saint Paul Island was part of the southernmost extension of the Beringia land bridge beginning in the early and middle Tertiary period. Presentday vegetation consists primarily of native plant species that developed more recently during the late Pliocene or early Pleistocene. The Beringia land bridge that once connected Northeast Asia with Western Alaska was subjected to a combination of traumatic climatic and geologic events. From a geologic perspective, over the years, Beringia has gone through periods of emergence from the Bering and Chukchi Seas followed by periods of submergence. These events resulted in cyclical periods of vegetation evolution and development followed by catastrophic vegetation die-off and depauperization. In general terms, grasslands, coastal marshes, bogs, meadows, heaths, alpine meadows, and tundra characterize the vegetation of Saint Paul Island. These categories can be grouped into the general land use classification of rangeland. Rangeland is defined as land on which the historic climax plant community is predominantly grasses, grasslike plants, forbs, shrubs, lichens, and mosses.

During the 1998-1999 field season, a range and soil survey was made. Ecological sites were mapped, soils and vegetation data were collected, and ecological sites were correlated with the soils. Part of the data collected during that survey is presented in this publication. Additional information will be developed as part of the Saint Paul Island Resource Management Plan. Detailed descriptions of ecological sites are in the Technical Guide, which is available at the Homer and Anchorage field offices of the Natural Resources Conservation Service.

Ecological Sites

Ecological sites provide resource managers with a tool for assessing ecological status of the rangeland and provide a framework for designing vegetation management systems for grazing, wildlife, subsistence, offroad vehicle management, and other uses. Although this range and soil survey was initiated for the purpose of reindeer grazing management, the information has numerous interpretive applications for all lands that principally support native or naturalized vegetation. Ecological sites are a land manager's tools for identifying, assessing, and interpreting rangeland. An ecological site is a basic unit of land classification and represents a type of land with a distinctive

combination of historic climax plant communities, soils, landforms, hydrology, climate, and ecological properties and processes. Examples of ecological properties and processes include vegetation succession, nutrient cycling, and productivity.

The relationship among climate, landforms, soils, and vegetation and the ability to discern differences in the cumulative effect of these factors from one site to another form the basis for ecological site classification. The ecological sites of Saint Paul Island are listed in table 12.

A secondary but equally important emphasis of site classification is landform and soil relationships. In general, the relationships between landforms and soils across the landscape are fairly predictable. Natural disturbances caused by wildfire, wind, flooding, and other events result in considerable variation in vegetation. Landforms and soils provide a stable resource base by which ecological sites can be determined regardless of existing vegetative conditions. In addition, inferences can be made regarding site dynamics and stability, soil processes, and appropriate management systems based on landform and soil types. While abrupt or distinct breaks between landforms, soils, and vegetation can occur, most commonly the transition is gradual and indistinct. In addition, precipitation, temperature, and other climatic patterns as well as microclimatic variables, such as elevation, change gradually across the landscape. An ecological site classification, therefore, should be viewed as a landscape model. The boundaries between ecological sites can be somewhat arbitrary and approximate. On the ground, the characteristics and properties within and between ecological sites are complex and variable and typically overlap to some degree. Ecological site classification provides a useful framework for correlating and compiling data and interpretations on multiple resources and landscape processes. Site classification is also a valuable framework for organizing, applying, and monitoring resource conservation systems for various land uses.

An ecological site characterizes the historic climax plant community. The historic climax plant community is defined as the plant community that was best adapted to the unique combination of factors associated with the ecological site. It was in a natural dynamic equilibrium with the historic biotic, abiotic, and climatic factors on its ecological site in North America at the time of European immigration and settlement (USDA, 1997). The historic climax plant community is an assemblage of plant species that achieve a long-term balance of plant composition, structure, and productivity without interferences by human activity under the present environmental conditions. In the absence of disturbances to the vegetation and changes in the site, succession on an ecological site eventually leads to a single plant community that has evolved as a result of the many interrelated environmental factors. Ecological sites can be used to represent a benchmark or reference point for vegetation management for a particular soil or group of soils supporting the same historic climax plant community. The ecological site classification provides a framework for recognizing and describing plant community succession-retrogression dynamics and relationships. By understanding and identifying the different plant communities that may occur on an ecological site, land managers and users can decide what plant community best fits their management objective.

Soils and Ecological Sites

An ecological site consists of a group of one or more soils that have similar vegetative and ecological potentials and processes. While a number of different soils may be grouped together into an ecological site, any individual soil may be included in only a single site. Thus, an ecological site can be determined simply by knowing the soil. This fact is particularly useful when the vegetation is not a definitive indicator of the site—for example, when disturbance or management has resulted in significant alteration of a historic climax plant community. This correlation means that an ecological site map can be derived from the soil map. The soil components correlated to the Saint Paul Island area ecological sites are listed in table 12.

Site Descriptions

Nontechnical ecological site descriptions are presented in the Appendix. The following paragraphs describe the different sections and terminology for each description.

Features describe general characteristics in terms of location on the landscape. Slope and elevation are defined in this section.

Vegetation is the grasses, grasslike plants, forbs, shrubs, lichens, and mosses that make up most of the potential natural plant community on each soil. The plants are identified by common and scientific names.

Vegetation composition and production (air-dry) describes the expected percentage of the major vascular plant groups that make up the annual production for each vascular species making up the historic climax plant community. It is the amount of vegetation that can be expected to grow annually (excluding lichens) on well managed rangeland that is supporting the potential natural plant community. It

includes all vegetation (excluding lichens), whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for normal years. Vascular herbage production is expressed in pounds per acre of air-dry vegetation for normal years, whereas lichen production is expressed as pounds per acre of total live lichen biomass (air-dry) for normal years. The amount of production or biomass that can be used as forage depends on the kinds of grazing animals, the grazing season, and forage availability throughout the grazing seasons.

Value for grazing reindeer briefly describes the interpretive use for the site and any concerns regarding reindeer management on that site.

Range Management Concepts

Range management requires knowledge of the kinds of soil and of the plant communities that occur on the soils. Rangeland conditions are assessed by utilizing similarity indices to compare the present plant community with the historic climax plant community or the desired plant community (the desired plant community is defined as one that provides adequate resource protection and meets the land owner's objectives). Similarity indices to the historic climax plant community describe the extent and direction of changes that have taken place between the current vegetation and the historic climax plant community. Similarity to the desired plant community is a measure of how near the current plant community is to the land owner's goal for the land.

Effective range management conserves rainfall, enhances water quality, reduces the hazard of downstream flooding, provides forage for livestock and wildlife, enhances recreational opportunities, and protects the soil.

Hydric Soils

In this section, hydric soils are defined and described and the hydric soils in the survey area are listed.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 1995). These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (USDA, 1999) and "Keys to Soil Taxonomy" (USDA, 1998b) and in the "Soil Survey Manual" (USDA, 1993).

If soils are wet enough for a long enough period to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils in this survey area are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and others, 1996; USDA, 1998a).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Those soils that meet the definition of hydric soils and, in addition, have at least one of the hydric soil indicators, are listed in table 13. This list can help in planning land uses; however, onsite investigation is required to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 1996; USDA, 1998a).

Some map units consist almost entirely of hydric

soils, such as map unit 11, Histic Cryaquepts-Typic Cryaquents complex, tidal, 0 to 3 percent slopes (in which all listed components are hydric). Other map units consist primarily of nonhydric soils, such as map unit 36, Zolotoi complex, 1 to 8 percent slopes (in which all listed components are nonhydric), or map unit 9, Einahnuhto silty clay loam-Andic Haplocryods, rubbly, complex, 1 to 8 percent slopes (in which hydric soils are present only as minor components). Hydric soils may occur as minor inclusions even in map units listed without any hydric soils in table 13.

Table 13 also lists the local landform on which each soil occurs, the hydric criteria code, and whether or not each soil meets the saturation, flooding, or ponding criteria for hydric soils. Codes for hydric soil criteria are explained in the following key:

Key to Hydric Soil Criteria

1. All Histosols except Folists, or
2. Soils in Aquic suborders, Aquic subgroups, Albolls suborder, Salorthids great group, Pell great groups of Vertisols, Pachic subgroups, or cumulic subgroups that are:
   a. somewhat poorly drained and have a frequently occurring water table at a depth of less than 0.5 foot for a significant period (usually more than 2 weeks) during the growing season, or
   b. poorly drained or very poorly drained and have either:
      (1) a frequently occurring water table at a depth of less than 0.5 foot for a significant period (usually more than 2 weeks) during the growing season if textures are coarse sand, sand, or fine sand in all layers within 20 inches, or for other soils
      (2) a frequently occurring water table at a depth of less than 1 foot for a significant period (usually more than 2 weeks) during the growing season if permeability is equal to or greater than 6.0 inches/hour in all layers within a depth of 20 inches, or
      (3) a frequently occurring water table at a depth of less than 1.5 feet for a significant period (usually more than 2 weeks) during the growing season if permeability is less than 6.0 inches/hour in any layer within a depth of 20 inches, or
3. Soils that are frequently ponded for long duration or very long duration during the growing season, or
4. Soils that are frequently flooded for long duration or very long duration during the growing season.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil map. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

Table 14 gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1998) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1998).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches (75 mm) in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches (75 mm) in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 10 inches (250 mm) in diameter and 3 to 10 inches (75 to 250 mm) in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches (75 mm) in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of particle-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2

percentage points) across classification boundaries, the classification in the marginal zone is generally omitted in the table.

Physical Properties

Table 15 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In table 15, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The term “permeability,” as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 15, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in table 15 as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the

more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. Soils are grouped according to the amount of stable aggregates more than 0.84 millimeter in size. Soils containing rock fragments can occur in any group. The groups are as follows:

1. 1 to 9 percent dry soil aggregates. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
2. 10 to 24 percent dry soil aggregates. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
3. 25 to 39 percent dry soil aggregates. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.
4. 25 to 39 percent dry soil aggregates with more than 35 percent clay or more than 5 percent calcium carbonate. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.
5. 40 to 44 percent dry soil aggregates. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.
6. 45 to 49 percent dry soil aggregates. These soils are very slightly erodible. Crops can easily be grown.
7. 50 percent or more dry soil aggregates. These soils are very slightly erodible. Crops can easily be grown.
8. Stony, gravelly, or wet soils and other soils that are not subject to wind erosion.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Properties

Table 16 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Water Features

Table 17 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when

thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Wet soil refers to a saturated zone in the soil. Table 17 indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. Table 17 indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

Soil Features

Table 18 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation

of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 1998b and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 19 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Inceptisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Cryept (*Cry*, meaning cold, plus *ept*, from Inceptisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Eutrocryepts (*Eutro*, meaning high base saturation, plus *cryept*, the suborder of the Inceptisols that has a cryic temperature regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Eutrocryepts.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed Typic Eutrocryepts.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example from the survey area is the Einahnuhto series.

Taxonomic Units and Their Morphology

In this section, the taxonomic groups recognized in the survey area are described. Characteristics of the soil and the material in which it formed are identified for each taxonomic unit. A pedon, a small three-dimensional area of soil, that is typical of the unit in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (USDA, 1993). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (USDA, 1999) and in “Keys to Soil Taxonomy” (USDA, 1998b). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the taxonomic unit.

Andic Haplocryods

Taxonomic Classification

- Andic Haplocryods

Setting

Depth class: Moderately deep or deep (20 to 60

inches, 50 to 150 cm) to bedrock
Drainage class: Moderately well drained
Permeability: Moderately rapid
Landform or position on the landform: Footslopes and backslopes of dipslopes and wide drainageways
Slope range: 1 to 8 percent
Elevation: 18 to 120 feet (6 to 36 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Andic Haplocryods, in an area of Aquic Haplocryands-Andic Haplocryods complex, 1 to 8 percent slopes, UTM Zone 2, 541184E, 6335175N; on a 4 percent slope at 60 feet (20 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), wild celery (Angelica lucida), scurvy grass (Cochlearia officinalis), meadow horsetail (Equisetum arvense), chickweed (Cerastium beeringianum), and Alaska violet (Viola langsdorffii):

Oi—0 to 4 inches (0 to 11 cm); very dark brown (7.5YR 2.5/2) peat; many fine roots; moderately acid (pH 5.5); clear smooth boundary.
EA—4 to 8 inches (11 to 20 cm); very dark gray (5YR 3/1) and dark reddish brown (5YR 2.5/2) medial silt loam; weak fine granular structure; friable; slightly smeary; slightly sticky and nonplastic; common fine roots; moderately acid (pH 5.5); clear smooth boundary.
Bs—8 to 13 inches (20 to 33 cm); dark reddish brown (5YR 3/2) medial very fine sandy loam; weak fine granular structure; friable; slightly smeary; nonsticky and nonplastic; few fine roots; moderately acid (pH 5.5); clear smooth boundary.
2BC—13 to 35 inches (33 to 88 cm); dark brown (7.5YR 3/4) very stony silt loam; weak medium subangular blocky structure; friable; nonsmeary; slightly sticky and slightly plastic; 50 percent stones; moderately acid (pH 5.5); gradual smooth boundary.
2C—35 to 54 inches (88 to 138 cm); brown (7.5YR 4/4) very stony silt loam; massive; friable; smeary; slightly sticky and slightly plastic; 50 percent stones; moderately acid (pH 5.5); clear smooth boundary.
2R—54 inches (138 cm); basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 2 to 4 inches (4 to 11 cm)

O horizon:
Color—value of 2.5 or 3; chroma of 2 or 3
Texture—peat, mucky peat (cobbly, very cobbly, stony, and very stony textures can occur)
Content of cobbles—0 to 40 percent
Content of stones—0 to 40 percent
Reaction—strongly acid to slightly acid

A horizon (if it occurs):
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 2 or 3
Texture—silt loam, fine sandy loam, very fine sandy loam (cobbly, very cobbly, stony, and very stony textures can occur)
Content of cobbles—0 to 40 percent
Content of stones—0 to 40 percent
Reaction—strongly acid to slightly acid

EA horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 1, 2, or 3
Texture—fine sandy loam, silt loam (cobbly, very cobbly, stony, and very stony textures occur)
Content of cobbles—0 to 40 percent
Content of stones—0 to 40 percent
Reaction—strongly acid to slightly acid

Bs horizon:
Color—hue of 2.5YR, 5YR, or 7.5YR; value of 2.5 or 3; chroma of 2, 3, or 4
Texture—silt loam, very fine sandy loan, fine sandy loam, loamy fine sand (cobbly, very cobbly, stony, and very stony textures occur)
Content of cobbles—0 to 40 percent
Content of stones—0 to 40 percent
Reaction—strongly acid to slightly acid

2BC horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 1, 2, 3, or 4
Texture—silt loam, fine sandy loam, sand (cobbly, stony, very stony, and very stony textures can occur)
Content of gravel—0 to 5 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 60 percent
Reaction—strongly acid to slightly acid

2C horizon:
Color—hue of 7.5YR, 10YR, or 5Y; value and chroma of 2, 3, or 4
Texture—silt loam, loam, fine sandy loam, sandy loam, loamy sand (gravelly, stony, and very stony textures can occur)
Content of gravel—0 to 30 percent
Content of stones—0 to 65 percent

Reaction—strongly acid to slightly acid

Aquic Dystrocryepts

Taxonomic Classification

- Aquic Dystrocryepts

Setting

Depth class: Deep or very deep (40 to more than 60 inches, 100 to more than 150 cm) to bedrock
Drainage class: Somewhat poorly drained
Permeability: Moderately rapid or rapid
Depth to water table: 28 to 48 inches (71 to 122 cm) (July and August)
Landform or position on the landform: Low-elevation plains and depressions on plains
Slope range: 0 to 8 percent
Elevation: 6 to 36 meters (18 to 110 feet)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (34 to 39 degrees C)
Growing degree days—600 to 700

Representative Pedon

Aquic Dystrocryepts, 0 to 3 percent slopes, UTM Zone 2, 553956E, 6344809N; on a 4 percent slope at 30 feet (10 m) elevation in an area supporting grass, horned dandelion (Taraxacum ceratophorum), mountain sagewort (Artemisia arctica), and meadow horsetail (Equisetum arvense):

Oe—0 to 2 inches (0 to 4 cm); dark brown (7.5YR 3/3) mucky peat; many fine roots; slightly acid (pH 6.1); clear smooth boundary.
A—2 to 4 inches (4 to 9 cm); very dark brown (7.5YR 2.5/2) fine sandy loam; weak fine granular structure; very friable; nonsmeary; nonsticky and nonplastic; common fine roots; moderately acid (pH 6.0); clear smooth boundary.
Bw—4 to 24 inches (9 to 60 cm); very dark brown (7.5YR 2.5/2) sand with lenses of fine sandy loam; weak moderate subangular blocky structure; very friable; nonsmeary; nonsticky and nonplastic; few fine roots; slightly acid (pH 6.2); clear wavy boundary.
C1—24 to 28 inches (60 to 70 cm); very dark brown (7.5YR 2.5/2) fine sandy loam; massive or weak moderate granular structure; friable; slightly smeary; slightly sticky and slightly plastic; few fine roots; common medium distinct dark gray (7.5YR 4/1) redoximorphic depletions; moderately acid (pH 6.0): gradual smooth boundary.
C2—28 to 55 inches (70 to 140 cm); dark brown (7.5YR 3/3), stratified sandy loam and loamy sand; massive; loose; nonsmeary; nonsticky and nonplastic; moderately acid (pH 6.0); gradual smooth boundary.
R—55 inches (140 cm); basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 1 to 4 inches (2 to 9 cm)

O horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 2 or 3
Texture—peat, mucky peat

A horizon:
Color—value of 2.5 or 3; chroma of 2 or 4
Texture—silt loam, very fine sandy loam, fine sandy loam, sandy loam, loamy sand
Reaction—moderately acid or slightly acid

Bw horizon:
Color—hue of 5YR or 7.5YR; value of 2.5, 3, or 4; chroma of 1, 2, 3, or 4
Texture—silt loam, fine sandy loam, loamy sand, sand
Reaction—moderately acid or slightly acid

BC horizon (if it occurs):
Color—hue of 7.5YR or 10YR; value of 2.5, 3, or 4; chroma of 2, 3, or 4
Texture—silt loam, loam, fine sandy loam, sand
Content of gravel—0 to 10 percent
Content of cobbles—0 to 10 percent
Reaction—moderately acid or slightly acid

C horizon:
Color—hue of 2.5YR, 5YR, 7.5YR, 10YR, 2.5Y, or 5Y; value of 2, 2.5, 3, 4, or 6; chroma of 2, 3, or 4
Texture—silt loam, loam, fine sandy loam, sandy loam, loamy fine sand, loamy sand (gravelly, very gravelly, stony, and very stony textures can occur)
Content of gravel—0 to 45 percent
Content of stones—0 to 40 percent
Reaction—moderately acid or slightly acid

Aquic Haplocryands

Taxonomic Classification

- Aquic Haplocryands

Setting

Depth class: Moderately deep or deep (20 to 60 inches, 50 to 150 cm) to bedrock
Drainage class: Somewhat poorly drained

Permeability: Moderately rapid over moderate
Depth to water table: More than 60 inches (150 cm) (July and August)
Landform or position on the landform: Wide drainageways on dipslopes
Slope range: 1 to 8 percent
Elevation: 20 to 82 feet (6 to 25 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Aquic Haplocryands, in an area of Aquic Haplocryands-Andic Haplocryods complex, 1 to 8 percent slopes, UTM Zone 2, 541169E, 6334839N; on a 2 percent slope at 130 feet (22 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), polargrass (Arctagrostis latifolia), Bering hairgrass (Deschampsia beringensis), crowberry (Empetrum nigrum), and Carex spp.

Oe—0 to 3 inches (0 to 8 cm); very dark brown (7.5YR 2.5/2) stony mucky peat; many fine and very fine roots; 10 percent stones; moderately acid (pH 6.0); clear smooth boundary.
A—3 to 8 inches (8 to 21 cm); dark reddish brown (5YR 2.5/2) medial stony silt loam; weak fine granular structure; friable; slightly smeary; slightly sticky and slightly plastic; common fine roots; 10 percent stones; moderately acid (pH 5.7); gradual smooth boundary.
Bw—8 to 16 inches (21 to 41 cm); dark reddish brown (2.5YR 2.5/2) and dark gray (7.5YR 4/1) medial cobbly fine sandy loam; weak fine granular structure; very friable; slightly smeary; slightly sticky and slightly plastic; few fine roots; common distinct black (7.5YR 2.5/1) redoximorphic depletions; 10 percent gravel; 10 percent cobbles; 5 percent stones; moderately acid (pH 5.6); gradual smooth boundary.
BC—16 to 24 inches (41 to 60 cm); brown (7.5YR 4/3) and very dark brown (7.5YR 2.5/2) cobbly silt loam; weak fine subangular blocky structure; friable; slightly smeary; slightly sticky and slightly plastic; few fine roots; 10 percent gravel; 10 percent cobbles; moderately acid (pH 5.8); clear wavy boundary.
2C—24 to 29 inches (60 to 73 cm); dark grayish brown (10YR 4/2) gravelly silt loam; massive; friable; nonsmeary; slightly sticky and slightly plastic; 25 percent gravel; moderately acid (pH 5.8); clear smooth boundary.
2R—29 inches (73 cm); brown (10YR 4/3), weathered basalt.

Range in Characteristics

Thickness of the organic layer: 2 to 4 inches (5 to 7 cm)
Surface stoniness: Stony, very stony, rubbly

O horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3
Texture—peat, mucky peat (stony textures can occur)
Content of stones—0 to 15 percent
Reaction—moderately acid or slightly acid

A horizon:
Color—hue of 5YR or 7.5YR
Texture—silt loam, fine sandy loam (stony textures can occur)
Content of stones—0 to 15 percent
Reaction—moderately acid or slightly acid

Bw horizon:
Color—hue of 2.5YR, 5YR, 7.5YR, or 10YR; value of 2.5, 3, or 4; chroma of 1, 2, 3, or 6
Texture—silt loam, fine sandy loam, loam (gravelly, cobbly, and stony textures can occur)
Content of gravel—0 to 10 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 15 percent
Reaction—moderately acid or slightly acid

BC horizon:
Color—hue of 5YR, 7.5YR, 10YR, or 2.5Y; value of 2.5, 3, 4, or 5; chroma of 1, 2, 3, or 4
Texture—silt loam, loam, clay loam, fine sandy loam (gravelly and cobbly textures can occur)
Content of gravel—10 to 20 percent
Content of cobbles—0 to 20 percent
Reaction—moderately acid or slightly acid

2C horizon:
Color—hue of 7.5YR or 10YR; value of 3 or 4; chroma of 2, 3, or 4
Texture—silt loam, loam, clay loam (gravelly and cobbly textures can occur)
Content of gravel—0 to 25 percent
Content of cobbles—0 to 20 percent
Reaction—moderately acid or slightly acid

Bogoslof Series

Taxonomic Classification

• Medial over sandy or sandy-skeletal, amorphic over mixed Vitrandic Dystrocryepts

Setting

Depth class: Very deep (more than 60 inches, 150 cm) to bedrock
Drainage class: Well drained
Permeability: Moderately rapid over rapid
Landform or position on the landform: Terraces on sandy plains, plains
Slope range: 0 to 3 percent
Elevation: 30 to 120 feet (9 to 39 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Typical Pedon

Bogoslof silt loam, 0 to 3 percent slopes, UTM Zone 2, 545815E, 6334798N; on a 3 percent slope at 50 feet (16 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), mountain foxtail (Alopecurus alpinus), sedge (Carex spp.), and yarrow (Achillea borealis):

Oi—0 to 2 inches (0 to 4 cm); very dark brown (7.5YR 2.5/3) peat; few fine and medium roots; neutral (pH 6.6); clear smooth boundary.
A—2 to 3.5 inches (4 to 9 cm); very dark brown (10YR 2/2) medial silt loam; weak fine granular structure; very friable; slightly smeary; slightly sticky and slightly plastic; few fine roots; slightly acid (pH 6.4); clear smooth boundary.
Bw—3.5 to 13 inches (9 to 32 cm); very dark brown (7.5YR 2.5/3) medial fine sandy loam; weak fine granular structure; very friable; slightly smeary; slightly sticky and slightly plastic; no roots; neutral (pH 6.6); clear smooth boundary.
2BC—13 to 51 inches (32 to 130 cm); dark brown (7.5YR 3/4) sand; massive or single grain; loose; nonsmeary; nonsticky and nonplastic; neutral (pH 6.8); gradual wavy boundary.
2C1—51 to 75 inches (130 to 190 cm); black (5Y 2.5/1) sand; single grain; loose; nonsmeary; nonsticky and nonplastic; neutral (pH 7.2); gradual smooth boundary.
3C2—75 to 79 inches (190 to 200 cm); black (7.5YR 2.5/1) and very dark brown (7.5YR 2.5/3), stratified sand and silt loam; massive; very friable; nonsmeary; nonsticky and nonplastic; neutral (pH 7.2).

Range in Characteristics

Thickness of the organic layer: 0.5 inch to 3 inches (1 to 8 cm)
Thickness of substitute particle-size class to contrasting particle-size class: 7 to 14 inches (18 to 36 cm)
Underlying material: Sand, stratified sand and silt loam

O horizon:
Color—hue of 7.5YR or 10YR; value of 2, 2.5, or 3; chroma of 2 or 3
Texture—peat, mucky peat
Reaction—slightly acid or neutral

A horizon:
Color—hue of 7.5YR or 10YR; value of 2, 2.5, or 3
Texture—silt loam, fine sandy loam
Reaction—moderately acid or slightly acid

Bw horizon:
Color—hue of 7.5YR or 5YR; value of 2.5 or 3; chroma of 2, 3, or 4
Texture—silt loam, very fine sandy loam, fine sandy loam, sand
Reaction—moderately acid to neutral

BC horizon (if it occurs):
Color—chroma of 3 or 4
Texture—silt loam, very fine sandy loam, loamy sand
Reaction—moderately acid or slightly acid

2BC horizon:
Color—value of 2.5 or 3; chroma of 3 or 4
Texture—sand, loamy sand
Reaction—slightly acid or neutral

2C horizon:
Color—hue of 10YR, 7.5YR, 2.5Y or 5Y; value of 2.5, 3, 4, or 5; chroma of 1, 2, 3, or 4
Texture—loamy sand, sand

3C horizon:
Color—hue of 7.5YR or 2.5Y; value of 2.5, 4, or 5; chroma of 1, 2, or 3
Texture—loamy sand, sand (thin strata of silt loam and sandy loam may occur)

Cryofluvents

Taxonomic Classification

- Cryofluvents

Setting

Depth class: Deep or very deep (more than 40 inches, 100 cm) to bedrock
Drainage class: Well drained
Permeability: Moderate over moderately rapid

Landform or position on the landform: Narrow drainageways
Slope range: 1 to 8 percent
Elevation: 36 to 75 feet (12 to 25 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Cryofluvents, in an area of Cryofluvents-Spodic Dystrocryepts complex, 1 to 8 percent slopes, UTM Zone 2, 544959E, 6339203N; on a 2 percent slope at 60 feet (20 m) elevation in an area supporting dunegrass (Elymus mollis), mountain sagewort (Artemisia tilesii), western hemlock-parsley (Conioselinum chinense), and yarrow (Achillea borealis):

Oe—0 to 3 inches (0 to 8 cm); dark brown (7.5YR 3/2) mucky peat; common fine roots; slightly acid (pH 6.3); clear smooth boundary.
C1—3 to 35 inches (8 to 90 cm); dark brown (7.5YR 3/3) and very dark brown (7.5YR 2.5/2), stratified silt loam and fine sandy loam; massive or weak thin platy structure; very friable; slightly smeary; slightly sticky and slightly plastic; common fine roots; slightly acid (pH 6.4); gradual smooth boundary.
C2—35 to 61 inches (90 to 156 cm); brown (7.5YR 4/4) and dark yellowish brown (10YR 4/6), stratified loamy fine sand and fine sandy loam; massive; very friable; nonsmeary; nonsticky and nonplastic; slightly acid (pH 6.5); abrupt smooth boundary.
R—61 inches (156 cm); hard basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 5 to 8 cm (2 to 3 inches)

O horizon:
Color—value of 2.5 or 3; chroma of 1 or 2
Texture—peat, mucky peat

C1 horizon:
Color—value of 2.5 or 3; chroma of 2 or 4
Texture—stratified silt loam, fine sandy loam, loamy very fine sand, fine sand

C2 horizon:
Color—hue of 7.5YR or 10YR; value of 3, 4, or 5; chroma of 3, 4, or 6
Texture—stratified loamy fine sand, fine sandy loam, fine sand, sand

Einahnuhto Series

Taxonomic Classification

- Fine-loamy, isotic Vitrandic Eutrocryepts

Setting

Depth class: Moderately deep (20 to 40 inches, 50 to 100 cm) to bedrock
Drainage class: Moderately well drained
Permeability: Moderately slow or moderate
Depth to water table: More than 60 inches (150 cm)
Landform: Dipslopes
Slope range: 1 to 8 percent
Elevation: 20 to 200 feet (7 to 66 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Typical Pedon

Einahnuhto silty clay loam, in an area of Einahnuhto silty clay loam-Andic Haplocryods, rubbly, complex, 1 to 8 percent slopes, UTM Zone 2, 539125E, 6335109N; on a 2 percent slope at 130 feet (22 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), polargrass (Arctagrostis latifolia), Bering hairgrass (Deschampsia beringensis), crowberry (Empetrum nigrum), and Carex spp.

Oe—0 to 3 inches (0 to 7 cm); dark brown (7.5YR 2/3) mucky peat; many fine roots; moderately acid (pH 5.8); clear smooth boundary.
A—3 to 6 inches (7 to 14 cm); dark brown (7.5YR 2.5/2) silty clay loam; weak fine granular structure; very friable; nonsmeary; slightly sticky and slightly plastic; common fine and few medium roots; strongly acid (pH 5.5); clear smooth boundary.
Bw—6 to 10 inches (14 to 25 cm); strong brown (7.5YR 4/6) and yellowish brown (10YR 5/4) silty clay loam; strong medium granular structure; friable; nonsmeary; sticky and plastic; few fine roots; 5 percent gravel; 5 percent cobbles; moderately acid (pH 5.6); gradual smooth boundary.
BC—10 to 20 inches (25 to 50 cm); brown (10YR 4/3 and 7.5Y 4/4) cobbly silty clay loam; strong moderate subangular blocky structure; friable; nonsmeary; sticky and plastic; few fine roots; common distinct grayish brown (2.5Y 5/2) redoximorphic depletions; 5 percent gravel; 10 percent cobbles; moderately acid (pH 5.8); gradual smooth boundary.

C—20 to 41 inches (50 to 105 cm); brown (10YR 4/3) cobbly silt loam; massive; firm; nonsmeary; sticky and plastic; 10 percent gravel; 10 percent cobbles; moderately acid (pH 6.0); clear smooth boundary.
R—41 inches (105 cm); brown (10YR 4/3), fractured basalt.

Range in Characteristics

Thickness of the organic layer: 1 to 3 inches (2.5 to 8 cm)
Thickness of the upper portion that meets Vitrandic subgroup criteria: 7 to 13 inches (18 to 34 cm)

O horizon:
Color—hue of 5YR or 7.5YR; value of 2 or 2.5; chroma of 2 or 3
Texture—peat, mucky peat

A horizon:
Color—value of 2.5, 3, or 4
Texture—silty clay loam, silt loam

Bw horizon:
Color—hue of 10YR or 7.5YR; value of 3, 4, or 5; chroma of 3 to 6
Texture—clay loam, silty clay loam, loam, silt loam
Content of gravel—0 to 10 percent
Content of cobbles—0 to 10 percent

BC horizon:
Color—hue of 7.5YR or 10YR; chroma of 3 or 4
Texture—silty clay loam, silt loam, loam (gravelly and cobbly textures can occur)
Content of gravel—0 to 15 percent
Content of cobbles—0 to 15 percent

C horizon:
Color—hue of 10YR or 2.5Y
Texture—silty clay loam, loam, silt loam (gravelly or cobbly textures can occur)
Content of gravel—10 to 20 percent
Content of cobbles—0 to 20 percent

Histic Cryaquepts

Taxonomic Classification

- Histic Cryaquepts

Setting

Depth class: Very deep (more than 60 inches, 150 cm) to bedrock
Drainage class: Poorly drained and very poorly drained
Permeability: Moderate over very rapid
Depth to water table: Less than 20 inches (50 cm) (July and August)
Landform or position on the landform: Tidal flats, lake margins, depressions on dunes and plains
Slope range: 0 to 8 percent
Elevation: 0 to 100 feet (0 to 33 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Histic Cryaquepts, sandy, in an area of Histic Cryaquepts-Terric Cryohemists complex, 0 to 3 percent slopes, UTM Zone 2, 546146E, 6334119N; on a 0 percent slope at 20 feet (7 m) elevation in an area supporting Lyngbye sedge (Carex lyngbyei), four-leaf marestail (Hippuris tetraphylla), white water buttercup (Ranunculus tricophyllus), and polar willow (Salix pulchra):

Oi—0 to 3 inches (0 to 7 cm); black (10YR 3/2) peat; many fine and few medium and coarse roots; slightly acid (pH 6.3); clear smooth boundary.
Oe—3 to 8 inches (7 to 20 cm); black (2.5Y 4/3) mucky peat; common fine and medium roots; moderately acid (pH 5.6); abrupt smooth boundary.
Cg—8 to 65 inches (20 to 166 cm); black (2.5Y 2/1), saturated sand; single grain; loose; nonsmeary; nonsticky and nonplastic; no roots; moderately acid (pH 6.0).

Range in Characteristics

Thickness of the organic layer: 8 to 16 inches (20 to 40 cm)
Flooding: None to frequent; very brief or brief periods
Ponding: Frequent; brief to very long periods

O horizon:
Color—hue of 10YR, 7.5YR, or 2.5Y; value of 2.5, 3, or 4; chroma of 1, 2, or 3
Texture—peat, mucky peat
Reaction—slightly acid to slightly alkaline

A horizon (if it occurs):
Color—hue of 10YR or 7.5YR; value of 2.5 or 3
Texture—sand, loamy sand, mucky sandy loam, mucky loamy sand, fine sandy loam
Reaction—moderately acid to neutral

Bw horizon (if it occurs):
Color—hue of 7.5YR or 10YR; value of 2.5 or 3; chroma of 1 or 2
Texture—sand, loamy sand, fine sandy loam, mucky silt loam
Reaction—moderately acid to neutral

C horizon (if it occurs):
Color—hue of 2.5Y or 10Y; value of 2.5 or 3; chroma of 1 or 2
Texture—sand, fine sandy loam, mucky silt loam
Reaction—moderately acid to slightly alkaline

Cg horizon:
Color—hue of 2.5Y, 10Y, or N; value of 2 or 3; chroma of 0 or 1
Texture—sand, fine sandy loam, mucky silt loam
Reaction—moderately acid to slightly alkaline

Humic Vitricryands

Taxonomic Classification

- Humic Vitricryands

Setting

Depth class: Deep or very deep (more than 40 inches, 100 cm) to bedrock
Drainage class: Well drained
Permeability: Moderately rapid and rapid over moderate
Landform or position on the landform: Dipslopes, strand plains, and beach terraces
Slope range: 1 to 8 percent
Elevation: 40 to 82 feet (12 to 27 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Humic Vitricryands, in an area of Humic Vitricryands-Vitrandic Dystrocryepts complex, rolling, UTM Zone 2, 550223E, 6339246N; on a 7 percent slope at 35 feet (16 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), Bering chickweed (Cerastium beeringianum), spike trisetum (Trisetum spicatum), and Bering sagebrush (Artemisia arctica beringensis):

Oi—0 to 2 inches (0 to 6 cm); very dark brown (7.5YR 2.5/2) peat; many fine and few medium roots; neutral (pH 6.4); clear smooth boundary.
A—2 to 5 inches (6 to 13 cm); dark brown (7.5YR 3/2) fine sandy loam; weak fine granular structure; very friable; slightly smeary; slightly sticky and slightly plastic; common fine roots; slightly acid (pH 6.1); gradual smooth boundary.
Bw—5 to 15 inches (13 to 38 cm); dark brown (7.5YR 3/2) and dusky red (2.5YR 3/2) very fine sandy loam; weak medium subangular blocky structure; friable; slightly smeary; slightly sticky and slightly plastic; few fine roots; moderately acid (pH 6.0); clear smooth boundary.
2BC—15 to 24 inches (38 to 61 cm); dark brown (7.5YR 3/2 and 3/3) sandy loam; massive or single grain; friable; nonsmeary; nonsticky and nonplastic; slightly acid (pH 6.4); gradual smooth boundary.
2C1—24 to 71 inches (61 to 180 cm); black (10Y 2.5/1) loamy sand; single grain; loose; nonsmeary; nonsticky and nonplastic; slightly acid (pH 6.3); abrupt smooth boundary.
3C2—71 to 77 inches (180 to 195 cm); very dark brown (7.5YR 2.5/2) silt loam; massive; friable; very smeary; sticky and plastic; neutral (pH 6.6).

Range in Characteristics

Thickness of the organic layer: 1 to 3 inches (2 to 8 cm)
Rock fragments: Gravel and cobbles are generally scoria and vesicular basalt.

O horizon:
Color—value of 2.5 or 3; chroma of 2 or 3
Texture—peat, mucky peat
Reaction—moderately acid or slightly acid

A horizon:
Color—hue of 7.5YR or 5YR; value of 2.5 or 3; chroma of 1 or 2
Texture—fine sandy loam, very fine sandy loam, silt loam
Reaction—moderately acid or slightly acid

Bw horizon:
Color—hue of 7.5YR, 5YR, or 2.5YR; chroma of 2 or 3
Texture—fine sandy loam, very fine sandy loam, loam
Reaction—moderately acid or slightly acid

BC horizon:
Color—hue of 10YR, 7.5YR, or 5YR; chroma of 2 or 3
Texture—sandy loam, loamy sand, fine sandy loam, very fine sandy loam (gravelly and cobbly textures can occur)
Content of gravel—0 to 50 percent
Content of cobbles—0 to 10 percent
Reaction—moderately acid or slightly acid

C horizon (if it occurs):
Color—hue of 10YR, 7.5YR, 5YR, or 2.5Y; value of 2.5 or 3; chroma of 1 or 2
Texture—sand, loamy sand, coarse sand (gravelly, cobbly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 25 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 80 percent
Reaction—moderately acid or slightly acid

2C horizon (if it occurs):
Color—hue of 10YR, 7.5YR, 2.5Y, or 10Y; value of 2, 3, 4, or 5; chroma of 1, 2, 3, or 4
Texture—sand, loamy sand, loamy very fine sand

3C horizon (if it occurs):
Color—hue of 10YR or 7.5YR; value of 2.5 or 3; chroma of 2 or 3
Texture—very fine sandy loam, silt loam (gravelly, cobbly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 50 percent
Content of cobbles—0 to 25 percent
Content of stones—0 to 90 percent
Reaction—slightly acid or neutral

Lithic Cryofolists

Taxonomic Classification

- Lithic Cryofolists

Setting

Depth class: Shallow (less than 20 inches, 50 cm) to bedrock
Drainage class: Somewhat poorly drained
Permeability: Very slow
Landform: Recent lava flows
Slope range: 1 to 60 percent
Elevation: 36 to 280 feet (12 to 85 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Lithic Cryofolists, in an area of Lithic Cryofolists-Rock outcrop complex, 4 to 16 percent slopes, UTM Zone 2, 536496E, 6336387N; on a rubble lava flow with a 4 percent slope at 220 feet (67 meters) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), Arctic bluegrass (Poa arctica), whorled lousewort (Pedicularis verticilatta), and crowberry (Empetrum nigrum):

Oi—0 to 2 inches (0 to 4 cm); dark reddish brown (5YR 2.5/2) peat; common fine and few coarse roots; few black (7.5YR 2/1) pieces of charcoal; slightly acid (pH 6.2); clear smooth boundary.
Oa1—2 to 13 inches (4 to 32 cm); black (5YR 2.5/1) extremely cobbly muck; friable; slightly smeary; slightly sticky and slightly plastic; common fine roots; moderately acid (pH 5.8); gradual irregular boundary.
Oa2—13 to 18 inches (32 to 46 cm); very dark brown (7.5YR 2.5/2) extremely cobbly muck; friable; slightly smeary; slightly sticky and slightly plastic; slightly acid (pH 6.2); clear irregular boundary.
R—18 inches (46 cm); fractured basalt rock.

Range in Characteristics

Surface stoniness: None to very rubbly

Oi horizon:
Color—chroma of 1 or 2
Texture—peat, mucky peat
Content of gravel—0 to 10 percent
Content of cobbles—0 to 35 percent
Content of stones—0 to 65 percent

Oa horizon:
Color—hue of 7.5YR or 5YR; value of 2.5 or 3; chroma of 1, 2, or 3
Texture—very cobbly muck, extremely cobbly muck, very stony muck, extremely stony muck
Content of gravel—0 to 10 percent
Content of cobbles—0 to 35 percent
Content of stones—0 to 65 percent
Reaction—moderately acid or slightly acid

Lithic Cryorthents

Taxonomic Classification

- Lithic Cryorthents

Setting

Depth class: Shallow (less than 20 inches, 50 cm) to bedrock
Drainage class: Well drained
Permeability: Rapid
Landform or position on the landform: Beach terraces and footslopes of dipslopes near the coast
Slope range: 0 to 8 percent
Elevation: 6 to 37 feet (2 to 12 meters)
Climatic data (average annual):
Precipitation—18 to 28 inches (46 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Lithic Cryorthents, in an area of Tsammana sand-Lithic Cryorthents complex, 0 to 3 percent slopes, UTM Zone 2, 539724E, 6334011N; on a 3 percent slope at 20 feet (6 m) elevation under open cover of Bering hairgrass (Deschampsia beringensis), mountain foxtail (Alopecurus alpinus), and moss:

Oe—0 to 2 inches (0 to 5 cm); very dark gray (5YR 3/1) mucky peat; common fine roots; slightly acid (pH 6.4); clear smooth boundary.
A—2 to 5 inches (5 to 12 cm); dark brown (10YR 3/3) loamy sand; massive; friable; nonsmeary; nonsticky and nonplastic; few fine roots; moderately acid (pH 6.0); clear wavy boundary.
C1—5 to 12 inches (12 to 31 cm); dark grayish brown (10YR 4/2) loamy sand; massive; friable; nonsmeary; nonsticky and nonplastic; slightly acid (pH 6.1); gradual smooth boundary.
C2—12 to 17 inches (31 to 43 cm); dark grayish brown (10YR 4/2) and dark reddish brown (5YR 3/2), stratified loamy sand and silt loam; massive; very friable; nonsmeary; nonsticky and nonplastic; moderately acid (pH 6.0); abrupt smooth boundary.
R—17 inches (43 cm); basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 1 to 2 inches (4 to 6 cm)

O horizon:
Color—hue of 10YR or 5YR
Texture—peat, mucky peat
Content of stones—0 to 15 percent
Reaction—moderately acid or slightly acid

A horizon:
Color—chroma of 1 or 3
Texture—loamy sand, sand (stony textures can occur)
Content of stones—0 to 25 percent
Reaction—moderately acid or slightly acid

C1 horizon:
Texture—sand and loamy sand (stony, very stony, and extremely stony textures can occur)
Content of stones—0 to 65 percent
Reaction—moderately acid or slightly acid

C2 horizon:
Color—hue of 10YR, 7.5YR, or 5YR; value of 3 or 4; chroma of 1 or 2
Texture—sand or stratified sand, loamy fine sand, fine sandy loam, and silt loam (stony, very stony, and extremely stony textures can occur)
Content of stones—0 to 80 percent
Reaction—moderately acid or slightly acid

Lithic Haplocryands

Taxonomic Classification

- Lithic Haplocryands

Setting

Depth class: Shallow (less than 20 inches, 50 cm) to bedrock
Drainage class: Well drained
Permeability: Moderately rapid
Landform or position on the landform: Rocky basalt hills, all positions; lava flows
Slope range: 1 to 60 percent
Elevation: 120 to 500 feet (36 to 152 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Lithic Haplocryands, in an area of Lithic Haplocryands, rubbly-Typic Haplocryands, moderately deep-Rock outcrop complex, 1 to 8 percent slopes, UTM Zone 2, 542231E, 6335640N; on a rocky upland with a 2 percent slope at 140 feet (46 meters) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), Arctic willow (Salix arctica), and crowberry (Empetrum nigrum):

Oi—0 to 2 inches (0 to 4 cm); very dark brown (7.5YR 2.5/3) stony mucky peat; common very fine, fine, and medium roots; 20 percent stones; slightly acid (pH 6.2); clear smooth boundary.
A—2 to 5 inches (4 to 12 cm); very dark brown (7.5YR 2.5/2) medial stony silt loam; weak medium granular structure; very friable; slightly smeary; nonsticky and nonplastic; common fine roots; 25 percent stones; slightly acid (pH 6.2); gradual irregular boundary.
Bw—5 to 13 inches (12 to 32 cm); very dark brown (7.5YR 3/2) medial very stony silt loam; weak medium subangular blocky structure; friable; slightly smeary; nonsticky and nonplastic; 25 percent stones; slightly acid (pH 6.2); gradual smooth boundary.
BC—13 to 19 inches (32 to 47 cm); dark brown (10YR 3/3) medial stony silt loam; massive; friable; slightly smeary; slightly sticky and nonplastic; 30 percent stones; slightly acid (pH 6.4); clear smooth boundary.
R—19 inches (47 cm); fractured basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 1 to 2.5 inches (2 to 6 cm)
Surface stoniness: None to very rubbly

O horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 2 or 3
Texture—peat, mucky peat (cobbly, stony, and very stony textures can occur)

Content of gravel—0 to 5 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 35 percent
Reaction—moderately acid or slightly acid

A horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 1 or 2
Texture—silt loam, very fine sandy loam, fine sandy loam (gravelly, very gravelly, extremely gravelly, cobbly, very cobbly, extremely cobbly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 65 percent
Content of cobbles—0 to 65 percent
Content of stones—0 to 75 percent
Reaction—moderately acid or slightly acid

Bw horizon:
Color—hue of 7.5YR or 5YR; value of 2.5, 3, or 4; chroma of 1, 2, or 3
Texture—silt loam, very fine sandy loam, fine sandy loam (gravelly, very gravelly, extremely gravelly, cobbly, very cobbly, extremely cobbly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 65 percent
Content of cobbles—0 to 65 percent
Content of stones—0 to 75 percent
Reaction—moderately acid or slightly acid

BC horizon:
Color—hue of 7.5YR or 10YR; value of 2.5 or 3; chroma of 2 or 3
Texture—silt loam, fine sandy loam (gravelly, very gravelly, extremely gravelly, cobbly, very cobbly, extremely cobbly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 70 percent
Content of cobbles—0 to 80 percent
Content of stones—0 to 20 percent
Reaction—moderately acid or slightly acid

C horizon (if it occurs):
Color—hue of 10YR or 7.5YR; value of 2 or 3; chroma of 2, 3, or 4
Texture—silt loam, very fine sandy loam, fine sandy loam (gravelly, very gravelly, extremely gravelly, cobbly, very cobbly, extremely cobbly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 70 percent
Content of cobbles—0 to 80 percent
Content of stones—0 to 20 percent

Lukanin Series

Taxonomic Classification

- Mixed Typic Cryopsamments

Setting

Depth class: Very deep (more than 60 inches, 150 cm) to bedrock
Drainage class: Well drained
Permeability: Rapid and very rapid
Landform: Dunes
Slope range: 1 to 60 percent
Elevation: 0 to 118 feet (0 to 36 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Lukanin sand, 1 to 60 percent slopes, UTM Zone 2, 544978E, 6333590N; on a 3 percent slope at 40 feet (13 m) elevation in an area supporting dunegrass (Elymus mollis), Nootka lupine (Lupinus nootkatensis), wild celery (Angelica lucida), meadow horsetail (Equisetum arvense), and western hemlock-parsley (Conioselinum chinense):

Oi—0 to 0.5 inch (0 to 1 cm); dark brown (10YR 3/3) peat; few fine and medium roots; slightly acid (pH 6.4); clear smooth boundary.
A—0.5 inch to 3 inches (1 to 7 cm); very dark brown (10YR 2/2) sand: single grain; loose; nonsmeary; nonsticky and nonplastic; few fine and medium roots; slightly acid (pH 6.4); clear smooth boundary.
C1—3 to 51 inches (7 to 130 cm); very dark grayish brown (10YR 3/2) sand; single grain; loose; nonsmeary; nonsticky and nonplastic; many fine and medium roots; slightly acid (pH 6.4); clear smooth boundary.
C2—51 to 59 inches (130 to 150 cm); very dark gray (10YR 3/1) sand; single grain; loose; nonsmeary; nonsticky and nonplastic; few fine roots; slightly acid (pH 6.4); clear smooth boundary.
C3—59 to 79 inches (150 to 200 cm); very dark grayish brown (10YR 3/2) loamy sand; single grain; loose; no roots; nonsmeary; nonsticky and nonplastic; slightly acid (pH 6.3).

Range in Characteristics

Thickness of the organic layer: 0.5 inch to 2 inches (1 to 5 cm)

O horizon:
Color—hue of 7.5YR or 10YR; value and chroma of 2 or 3
Reaction—moderately acid or slightly acid

A horizon:
Color—hue of 10YR, 7.5YR, or 2.5Y; value of 2 or 2.5; chroma of 1 or 2
Reaction—slightly acid or neutral

C horizon:
Color—hue of 10YR or 7.5YR; value of 2, 2.5, or 3; chroma of 1 or 2
Texture—sand, loamy sand (some thin strata of sandy loam and silt loam)
Reaction—slightly acid or neutral

Polovina Family

Taxonomic Classification

- Medial, amorphic Humic Vitricryands

Setting

Depth class: Moderately deep to very deep (20 to more than 60 inches, 50 to more than 150 cm) to bedrock
Drainage class: Moderately well drained and well drained
Permeability: Moderately rapid and rapid over moderately slow and slow
Landform or position on the landform: Plains, summits and backslopes on hills and dipslopes
Slope range: 0 to 30 percent
Elevation: 6 to 122 meters (18 to 245 feet)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Polovina family, very deep, 10 to 30 percent slopes, UTM Zone 2, 544158E, 6333461N; on a 2 percent slope at 50 feet (15 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis) and mountain foxtail (Alopecurus alpinus):

Oi—0 to 4 inches (0 to 9 cm); very dark brown (7.5YR 2.5/3) peat; many fine roots; neutral (pH 6.8); clear smooth boundary.
A—4 to 12 inches (9 to 30 cm); black (5YR 2.5/1) sandy loam; weak fine granular structure; very friable; very smeary; slightly sticky and slightly plastic; common fine and few medium roots; neutral (pH 6.6); clear smooth boundary.
Bw—12 to 26 inches (30 to 65 cm); very dark brown (7.5YR 2.5/2) sandy loam; moderate medium subangular blocky structure; very friable; slightly smeary; slightly sticky and slightly plastic; neutral (pH 6.6); gradual smooth boundary.
BC1—26 to 47 inches (65 to 120 cm); dark brown (7.5Y 3/2) sandy loam; weak fine subangular blocky structure; very friable; nonsmeary; nonsticky and nonplastic; neutral (pH 6.6); gradual smooth boundary.
BC2—47 to 63 inches (120 to 160 cm); dark brown (7.5Y 3/2) cobbly sandy loam; single grain; very friable; nonsmeary; nonsticky and nonplastic; 25 percent cobbles; slightly acid (pH 6.2); clear smooth boundary.
2C—63 to 73 inches (160 to 185 cm); brown (10YR 4/3) very gravelly silt loam; moderate medium subangular blocky structure; very friable; very smeary; sticky and plastic; 40 percent gravel; slightly acid (pH 6.2).
2R—73 inches (185 cm); basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 1 to 4 inches (3 to 9 cm)

O horizon:
Color—value of 2.5 or 3; chroma of 2 or 3
Reaction—slightly acid or neutral

A or AE horizon:
Color—hue of 5YR or 7.5YR; chroma of 1 or 2
Texture—fine sandy loam, silt loam, sandy loam
Reaction—slightly acid or neutral

Bw horizon:
Color—hue of 5YR, 7.5YR, or 10YR; value of 2, 2.5, or 3; chroma of 2 or 3
Texture—sandy loam, fine sandy loam, silt loam, loamy fine sand (cobbly or stony textures may occur)
Content of cobbles—0 to 30 percent
Content of stones—0 to 30 percent
Reaction—slightly acid or neutral

BC horizon:
Texture—fine sandy loam, loamy sand, loamy fine sand, sandy loam (cobbly or stony textures may occur)
Content of cobbles—0 to 30 percent
Content of stones—0 to 30 percent

2C horizon (if it occurs):
Color—hue of 10YR, 7.5YR, 5YR, or 2.5Y; value of 3 or 4; chroma of 1, 2, or 3
Texture—sand, loamy sand, loamy fine sand, very fine sandy loam, loam, silt loam (gravelly, very

gravelly, cobbly, very cobbly, and stony textures can occur)
Content of gravel—0 to 50 percent
Content of cobbles—0 to 35 percent
Content of stones—0 to 20 percent

Polovina Series

Taxonomic Classification

- Medial, amorphic Humic Vitricryands

Setting

Depth class: Deep (40 to 60 inches, 100 to 150 cm) to bedrock
Drainage class: Well drained
Permeability: Moderately rapid
Landform or position on the landform: Plains and dipslopes
Slope range: 0 to 8 percent
Elevation: 30 to 120 feet (9 to 40 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Typical Pedon

Polovina fine sandy loam, 0 to 3 percent slopes, UTM Zone 2, 545884E, 6334438N; on a 2 percent slope at 50 feet (15 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis) and mountain foxtail (Alopecurus alpinus):

Oe—0 to 2 inches (0 to 4 cm); very dark brown (7.5YR 2.5/3) mucky peat; common fine and medium roots; slightly acid (pH 6.5); clear smooth boundary.
A—2 to 4 inches (4 to 9 cm); very dark brown (10YR 2/2) fine sandy loam; weak fine granular structure; very friable; slightly smeary; nonsticky and nonplastic; common fine roots; slightly acid (pH 6.4); clear wavy boundary.
Bw—4 to 19 inches (9 to 49 cm); very dark brown (7.5YR 2.5/3) sandy loam; weak medium subangular blocky structure; friable; nonsmeary; nonsticky and nonplastic; few fine roots; moderately acid (pH 6.0); gradual wavy boundary.
2BC—19 to 37 inches (49 to 95 cm); dark olive brown (2.5Y 3/3) medial silt loam; moderate fine subangular blocky structure; friable; slightly smeary; nonsticky and nonplastic; moderately acid (pH 6.0); clear wavy boundary.
3C—37 to 55 inches (95 to 140 cm); dark olive brown (2.5Y 3/3) gravelly silt loam; weak angular blocky structure; friable; slightly smeary; nonsticky and nonplastic; 25 percent gravel; slightly acid (pH 6.2).
3R—55 inches (140 cm); basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 1 to 3 inches (3 to 7 cm)

O horizon:
Color—value of 2.5 or 3; chroma of 2 or 3
Texture—peat, mucky peat
Reaction—moderately acid or slightly acid

A horizon:
Color—hue of 10YR, 7.5YR, or 5YR; value of 2 or 2.5
Texture—fine sandy loam, very fine sandy loam
Reaction—moderately acid or slightly acid

Bw horizon:
Color—hue of 5YR, 7.5YR, or 10YR; value of 2.5 or 3; chroma of 2, 3, or 4
Texture—sandy loam, fine sandy loam, very fine sandy loam
Reaction—moderately acid or slightly acid

2BC horizon:
Color—hue of 2.5YR, 5YR, or 7.5YR; value of 2.5 or 3; chroma of 2 or 3
Texture—very fine sandy loam, silt loam
Reaction—moderately acid or slightly acid

2C horizon:
Color—hue of 5YR, 7.5YR, 10YR, or 2.5Y; value of 3, 4, or 5; chroma of 2, 3, 4, 6, or 8
Texture—silt loam, very fine sandy loam (gravelly and cobbly textures can occur)
Content of gravel—0 to 35 percent
Content of cobbles—0 to 35 percent
Reaction—moderately acid or slightly acid

Spodic Dystrocryepts

Taxonomic Classification

- Spodic Dystrocryepts

Setting

Depth class: Deep or very deep (more than 40 inches, 100 cm) to bedrock
Drainage class: Well drained
Permeability: Moderately rapid
Landform or position on the landform: Narrow drainageways
Slope range: 1 to 8 percent

Elevation: 18 to 76 feet (6 to 25 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Spodic Dystrocryepts, in an area of Cryofluvents-Spodic Dystrocryepts complex, 1 to 8 percent slopes, UTM Zone 2, 544959E, 6339203N; on a 1 percent slope at 70 feet (23 m) elevation in an area supporting dunegrass (Elymus mollis), Bering hairgrass (Deschampsia beringensis), mountain sagewort (Artemisia tilesii), and Nootka lupine (Lupinus nootkatensis):

Oi/A—0 to 3 inches (0 to 8 cm); black (7.5YR 2.5/1) mucky peat and silt loam; very friable; smeary; slightly sticky and nonplastic; many fine roots; slightly acid (pH 6.2); clear smooth boundary.
A—3 to 6 inches (8 to 16 cm); very dark brown (7.5YR 2.5/2 and 10YR 2/2) silt loam; weak fine granular structure; very friable; slightly smeary; slightly sticky and nonplastic; common fine roots; slightly acid (pH 6.3); clear smooth boundary.
Bw—6 to 13 inches (16 to 34 cm); dark reddish brown (5YR 3/3) silt loam; weak fine subangular blocky structure; friable; nonsmeary; slightly sticky and nonplastic; few fine roots; slightly acid (pH 6.4); clear wavy boundary.
Ab—13 to 15 inches (34 to 38 cm); very dark gray (5YR 3/1) medial silt loam; weak fine subangular blocky structure; friable; slightly smeary; slightly sticky and nonplastic; 6 percent gravel; slightly acid (pH 6.2); gradual smooth boundary.
BCm—15 to 20 inches (38 to 50 cm); dark brown (7.5YR 3/2) fine sand; massive; firm; very weakly cemented; nonsmeary; nonsticky and nonplastic; slightly acid (pH 6.4); gradual smooth boundary.
C1—20 to 40 inches (50 to 100 cm); dark brown (7.5YR 3/3) fine sand; massive; friable; nonsmeary; nonsticky and nonplastic; slightly acid (pH 6.4); clear smooth boundary.
C2—40 to 48 inches (100 to 122 cm); brown (7.5YR 4/4) silt loam; massive; very friable; very smeary; nonsticky and nonplastic; slightly acid (pH 6.3); clear smooth boundary.
C3—48 to 79 inches (122 to 200 cm); yellowish brown (10YR 5/6) loamy very fine sand; massive; very friable; nonsmeary; nonsticky and nonplastic; slightly acid (pH 6.5).
2R—79 inches (200 cm); basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 2 to 3 inches (5 to 8 cm)
Depth to weakly cemented layer (if it occurs): 15 to 30 inches (38 to 76 cm)

O/A horizon (if it occurs):
Color—hue of 7.5YR or 2.5YR; chroma of 1, 3, or 4
Texture—mucky peat, mucky silt loam, silt loam

A horizon:
Color—hue of 10YR, 7.5YR, or 5YR; value of 2 or 2.5; chroma of 1 or 2
Texture—silt loam, extremely stony silt loam
Content of stones—0 to 65 percent

Bw horizon:
Color—hue of 5YR or 7.5YR; chroma of 2 or 3
Texture—silt loam, very stony silt loam
Content of stones—0 to 65 percent

Ab horizon (if it occurs):
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 1 or 2
Texture—very fine sandy loam or silt loam

BCm horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 2 or 3
Texture—fine sand, loamy fine sand

C horizon:
Color—hue of 2.5Y, 7.5YR, or 10YR; value of 3, 4, or 5; chroma of 2, 3, 4, or 6
Texture—very fine sandy loam, fine sand, silt loam, loamy very fine sand (gravelly, stony, and very stony textures can occur)
Content of gravel—0 to 30 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 40 percent

Terric Cryohemists

Taxonomic Classification

- Terric Cryohemists

Setting

Depth class: Deep (more than 60 inches, 150 cm) to bedrock
Drainage class: Very poorly drained or poorly drained
Permeability: Rapid over very slow
Depth to water table: 10 to 20 inches (25 to 50 cm) (July and August)
Landform or position on the landform: Lake shores, drainageways on dipslopes, lake plains

Slope range: 0 to 8 percent
Elevation: 0 to 110 feet (0 to 36 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Terric Cryohemists, in an area of Histic Cryaquepts-Terric Cryohemists complex, 0 to 3 percent slopes, UTM Zone 2, 544486E, 6334874N; on a 3 percent slope at 40 feet (13 m) elevation in an area supporting Lyngbye sedge (Carex lyngbyei), tall cottongrass (Eriophorum angustifolium), western hemlock-parsley (Conioselinum chinense), and coltsfoot (Petasites hyperboreus):

Oi—0 to 24 inches (0 to 61 cm); very dark brown (7.5YR 2.5/2) and dark brown (7.5YR 3/2) peat; common fine roots; moderately acid (pH 5.6); gradual smooth boundary.
Oe—24 to 45 inches (61 to 115 cm); dark brown (7.5YR 3/2) mucky peat; no roots; strongly acid (pH 5.4); clear smooth boundary.
Oa—45 to 52 inches (115 to 132 cm); very dark brown (7.5YR 2.5/2) muck; no roots; moderately acid (pH 5.8); clear smooth boundary.
Cg—52 to 66 inches (132 to 166 cm); dark olive gray (5YR 3/2) loamy sand; massive; very friable; smeary; slightly sticky and slightly plastic; no roots; moderately acid (pH 6.0).

Range in Characteristics

Depth to mineral surface layer: 16 to 52 inches (40 to 132 cm)
Ponding: None to frequent; long or very long periods

O horizon:
Color—value of 2, 2.5, or 3
Texture—peat, mucky peat, or muck; lenses of mucky silt loam
Reaction—strongly acid or moderately acid

Cg horizon:
Color—hue of 5B, 10Y, 2.5Y, 5Y, or 2.5YR; value of 2.5, 3, or 4; chroma of 1 or 2
Texture—silt loam, mucky silt loam, sand, loamy sand
Reaction—moderately acid or slightly acid

Tsammana Series

Taxonomic Classification

• Medial over sandy or sandy-skeletal, isotic over mixed Vitrandic Dystrocryepts

Setting

Depth class: Deep (40 to 60 inches, 100 to 150 cm) to bedrock
Drainage class: Well drained
Permeability: Moderately rapid or rapid
Landform or position on the landform: Beach terraces, footslopes of dipslopes near the coast
Slope range: 0 to 8 percent
Elevation: 7 to 82 feet (2 to 25 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Typical Pedon

Tsammana sand, 1 to 8 percent slopes, UTM Zone 2, 553505E, 6345064N; on a 7 percent slope at 35 feet (16 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), Bering chickweed (Cerastium beeringianum), spike trisetum (Trisetum spicatum), and Bering sagebrush (Artemisia arctica beringensis):

Oe—0 to 1 inch (0 to 3 cm); very dark gray (10YR 3/1) peat; many very fine and fine roots; moderately acid (pH 5.6); clear smooth boundary.
A1—1 to 3 inches (3 to 8 cm); dark yellowish brown (10YR 3/4) sand; weak fine granular structure; very friable; nonsmeary; nonsticky and nonplastic; common very fine and fine roots; strongly acid (pH 5.4); clear wavy boundary.
A2—3 to 5 inches (8 to 12 cm); very dark brown (7.5YR 2.5/2) sandy loam; weak medium subangular blocky structure; friable; nonsmeary; nonsticky and nonplastic; few fine roots; strongly acid (pH 5.4); clear smooth boundary.
Bw1—5 to 8 inches (12 to 20 cm); dark brown (7.5YR 3/2) fine sandy loam; weak medium platy structure; friable; nonsmeary; nonsticky and nonplastic; few fine roots; moderately acid (pH 5.6); gradual wavy boundary.
Bw2—8 to 15 inches (20 to 39 cm); dark brown (7.5YR 3/3) loamy fine sand; weak medium platy structure; friable; slightly smeary; nonsticky and nonplastic; few fine roots; 5 percent cobbles; moderately acid (pH 5.6); gradual wavy boundary.
2BC—15 to 34 inches (39 to 86 cm); dark brown (10YR 3/3) very cobbly loamy sand; weak medium platy structure; very friable; nonsmeary; nonsticky and nonplastic; 5 percent gravel; 35 percent cobbles; 20 percent stones; no roots; strongly acid (pH 5.5); gradual wavy boundary.
2C—34 to 56 inches (86 to 143 cm); dark brown (7.5YR 3/4) very cobbly sand; weak medium platy

structure; very friable; nonsmeary; nonsticky and nonplastic; 5 percent gravel; 35 percent cobbles; 20 percent stones; no roots; very strongly acid (pH 5.0).
2R—56 inches (143 cm); brown (10YR 4/3) basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 1 to 4 inches (2 to 10 cm)
Underlying material: Boulders and basalt bedrock

A1 horizon (if it occurs):
Color—hue of 2.5YR or 10YR; value of 2.5, 3, or 4; chroma of 1 to 4
Texture—coarse sand, sand, loamy sand
Reaction—strongly acid or moderately acid

A2 horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 2, 3, or 4
Texture—fine sandy loam, coarse sand, silt loam, sandy loam
Reaction—strongly acid or moderately acid

Bw1 horizon:
Color—hue of 5YR or 7.5YR; value of 2.5, 3, or 4; chroma of 2, 3, or 4
Texture—sand, loamy sand, fine sandy loam
Content of cobbles—0 to 10 percent
Content of stones—0 to 35 percent
Reaction—strongly acid or moderately acid

Bw2 horizon:
Color—hue of 5YR, 7.5YR, or 10YR; value of 2.5, 3, or 4; chroma of 2, 3, or 4
Texture—loamy sand, loamy fine sand
Content of cobbles—5 to 10 percent
Content of stones—0 to 35 percent
Reaction—strongly acid or moderately acid

2BC horizon:
Color—hue of 7.5YR or 10YR; value of 3 or 4; chroma of 2, 3, or 4
Texture—loamy sand, sand (cobbly, stony, and very stony textures can occur)
Content of gravel—0 to 10 percent
Content of cobbles—0 to 35 percent
Content of stones—0 to 50 percent
Reaction—strongly acid or moderately acid

2C horizon:
Color—hue of 5YR, 7.5YR, or 10YR; value of 2.5, 3, or 4; chroma of 2, 3, or 4
Texture—sand, loamy sand, loamy fine sand (cobbly, stony, and very stony textures can occur)
Content of gravel—0 to 35 percent
Content of cobbles—0 to 35 percent
Content of stones—0 to 50 percent
Reaction—very strongly acid or strongly acid

Typic Cryaquents

Taxonomic Classification

- Typic Cryaquents

Setting

Depth class: Very deep (more than 150 cm or 60 inches) to bedrock
Drainage class: Very poorly drained or poorly drained
Permeability: Very slow to rapid
Depth to water table: 3 to 20 inches (7 to 50 cm) (July and August)
Landform or position on the landform: Tidal flats, depressions on plains
Slope range: 0 to 3 percent
Elevation: meters: 0 to 30 feet (0 to 9 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Typic Cryaquents, sandy, 0 to 3 percent slopes, UTM Zone 2, 552276E, 6342780N; in a depression on a 1 percent slope at 13 feet (4 m) elevation in an area supporting water sedge (Carex aquatilus), Arctic rush (Juncus arcticus), Gmelin sedge (Carex gmelinii), and northern starwort (Stellaria calycantha):

Oi—0 to 3 inches (0 to 7 cm); black (10YR 2/1) peat; many fine roots; slightly acid (pH 6.5); clear smooth boundary.
Cg1—3 to 16 inches (7 to 41 cm); black (N 2.5/0), saturated sand; single grain; loose; nonsmeary; nonsticky and nonplastic; no roots; neutral (pH 6.9); gradual smooth boundary.
Cg2—16 to 65 inches (41 to 165 cm); black (5Y 2.5/1), saturated sand; single grain; loose; nonsmeary; nonsticky and nonplastic; no roots; common medium prominent strong brown (7.5YR 5/6) redox concentrations; neutral (pH 6.9).

Range in Characteristics

Thickness of the organic layer: 4 to 11 cm (2 to 4 inches)
Flooding: None to very frequent; very brief or brief periods
Ponding: Frequent or occasional; brief to very long periods

O horizon:
Color—hue of 7.5YR or 10YR; value of 2 or 3; chroma of 1 or 2
Texture—peat, mucky peat, muck
Reaction—slightly acid or neutral

A horizon (if it occurs):
Color—hue of 10YR or 7.5YR; chroma of 1 or 2
Texture—sand, loamy fine sand, mucky silt loam

Cg horizon:
Color—hue of N, 10Y, 5B, 2.5Y, 5Y, or 10YR; value of 2.5 or 3; chroma of 0 or 1
Texture—sand, loamy sand, silt loam
Reaction—slightly acid to slightly alkaline

Typic Dystrocryepts

Taxonomic Classification

- Typic Dystrocryepts

Setting

Depth class: Moderately deep or deep (20 to 60 inches, 50 to 150 cm) to bedrock
Drainage class: Well drained
Permeability: Moderate or moderately rapid
Landform or position on the landform: Undulating plains, footslopes of dipslopes
Slope range: 1 to 8 percent
Elevation: 6 to 110 feet (2 to 36 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Typic Dystrocryepts, deep, in an area of Typic Dystrocryepts complex, undulating, UTM Zone 2, 543037E, 6335106N; on a 4 percent slope at 66 feet (20 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), mountain foxtail (Alopecurus alpinus), and yarrow (Achillea borealis):

Oe—0 to 2 inches (0 to 5 cm); very dark brown (7.5YR 2.5/2) mucky peat; common fine roots; moderately acid (pH 5.9); clear wavy boundary.
A—2 to 7 inches (5 to 18 cm); very dark brown (7.5YR 2.5/2) sandy loam; weak very fine granular structure; very friable; nonsmeary; nonsticky and slightly plastic; common fine roots; moderately acid (pH 5.9); clear smooth boundary.
Bw—7 to 15 inches (18 to 37 cm); dark reddish brown (5YR 2.5/2) loamy sand with lenses of sand; weak fine subangular blocky structure; friable; nonsmeary; nonsticky and nonplastic; common fine roots; moderately acid (pH 6.0); gradual smooth boundary.
BC—15 to 31 inches (37 to 78 cm); very dark gray (10YR 3/1) and dark reddish brown (5YR 3/3) sand with lenses of sandy loam; single grain; loose; nonsmeary; nonsticky and nonplastic; few fine roots; moderately acid (pH 6.0); clear wavy boundary.
C—31 to 45 inches (78 to 114 cm); dark reddish brown (5YR 3/3) and very dark gray (10YR 3/1) sandy loam and sand; weak medium subangular blocky structure; friable; nonsmeary; nonsticky and nonplastic; moderately acid (pH 6.0); abrupt smooth boundary.
2R—45 inches (114 cm); brown (10YR 4/3) basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 1 to 3 inches (3 to 8 cm)
Depth to bedrock: 20 to 60 inches (50 to 150 cm)

O horizon:
Color—hue of 10YR or 7.5YR; value of 2.5, 3, or 5; chroma of 1, 2, or 3
Texture—peat, mucky peat
Reaction—moderately acid or slightly acid

A horizon:
Color—hue of 10YR, 7.5YR, or 5YR; value of 2 or 2.5
Texture—silt loam, fine sandy loam, loamy fine sand, loamy sand, coarse sand
Reaction—moderately acid or slightly acid

Bw horizon:
Color—hue of 10YR, 7.5YR, or 5YR; value of 2.5 or 3; chroma of 2 or 3
Texture—fine sandy loam, loamy fine sand, loamy sand, sand, coarse sand (gravelly, stony, and very stony textures can occur)
Content of gravel—0 to 25 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 80 percent
Reaction—moderately acid or slightly acid

BC horizon (if it occurs):
Color—hue of 10YR, 7.5YR, or 5YR; value of 2.5 or 3; chroma of 1, 2, or 3
Texture—silt loam, sandy loam, loamy sand, sand (gravelly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 25 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 80 percent
Reaction—moderately acid or slightly acid

C horizon:
Color—hue of 10YR, 7.5YR, 5YR, or 2.5Y; value of 2.5 or 3; chroma of 1, 2, or 3
Texture—sandy loam, loamy sand, coarse sand, sand, silt loam (gravelly, cobbly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 25 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 80 percent
Reaction—moderately acid or slightly acid

Typic Eutrocryepts

Taxonomic Classification

- Typic Eutrocryepts

Setting

Depth class: Deep (40 to 60 inches, 100 to 150 cm) to bedrock
Drainage class: Moderately well drained
Permeability: Rapid over moderate
Landform or position on the landform: Backslopes of hills and dipslopes near the coast
Slope range: 4 to 16 percent
Elevation: 55 to 110 feet (18 to 36 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Typic Eutrocryepts, 4 to 16 percent slopes, UTM Zone 2, 543460E, 6332976N; on a 7 percent slope at 90 feet (30 m) elevation in an area supporting beach pea (Lathyrus maritimus), many-flowered wood rush (Luzula multiflora), wild celery (Angelica lucida), tall Jacob's-ladder (Polemonium acutifolium), and Arctic willow (Salix arctica):

Oi—0 to 1 inch (0 to 3 cm); dark brown (7.5YR 3/2) peat; few fine and common medium roots; neutral (pH 6.8); clear smooth boundary.
Oa—1 to 2 inches (3 to 6 cm); very dark brown (7.5YR 2.5/2) mucky peat; few fine and medium roots; neutral (pH 6.8); clear smooth boundary.
A1—2 to 5 inches (6 to 12 cm); reddish black (2.5YR 2.5/1) sand; single grain; loose; nonsmeary; nonsticky and nonplastic; few fine and medium roots; neutral (pH 7.0); abrupt smooth boundary.
2A2—5 to 7 inches (12 to 17 cm); very dark brown (10YR 2/2) fine sandy loam; weak medium subangular blocky structure; very friable; nonsmeary; slightly sticky and slightly plastic; 10 percent gravel; few fine roots; neutral (pH 7.1); clear wavy boundary.
3Bw—7 to 25 inches (17 to 65 cm); brown (10YR 4/3) and dark brown (10YR 3/3) very gravelly silt loam; moderate medium granular structure; friable; nonsmeary; slightly sticky and slightly plastic; no roots; 35 percent gravel; common prominent very dark gray (7.5YR 3/1) redoximorphic depletions; neutral (pH 7.3); clear wavy boundary.
3BC—25 to 43 inches (65 to 110 cm); olive brown (2.5Y 4/4) very gravelly silt loam; moderate medium subangular blocky structure; firm; nonsmeary; slightly sticky and slightly plastic; 60 percent gravel; slightly alkaline (pH 7.4); gradual wavy boundary.
3C—43 to 45 inches (110 to 115 cm); olive brown (2.5Y 4/3) and light olive brown (2.5Y 5/6) extremely gravelly silt loam; massive; very friable; nonsmeary; nonsticky and nonplastic; 75 percent gravel; slightly alkaline (pH 7.4); gradual wavy boundary.
3R—45 inches (115 cm); fractured basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 1.0 to 2.5 inches (3 to 6 cm)
Thickness of the sandy surface layer: 0 to 4.5 inches (0 to 11 cm)

O horizon:
Color—value of 2.5 or 3; chroma of 1 or 2
Texture—peat, mucky peat

A and 2A horizons:
Color—hue of 10YR or 2.5YR; value of 2 or 2.5; chroma of 1 or 2
Texture—sand, fine sand, fine sandy loam
Content of gravel—0 to 10 percent

3B horizons:
Color—hue of 10YR or 2.5Y; value and chroma of 3 or 4
Content of gravel—35 to 60 percent
Reaction—neutral or slightly alkaline

3C horizon:
Color—value of 4 or 5; chroma of 3, 4, or 6
Texture—very gravelly silt loam, extremely gravelly silt loam
Content of gravel—60 to 85 percent

Typic Haplocryands

Taxonomic Classification

- Typic Haplocryands

Setting

Depth class: Moderately deep or deep (20 to 60 inches, 50 to 150 cm) to bedrock
Drainage class: Well drained
Permeability: Moderately rapid over moderate
Landform or position on the landform: Dipslopes and rocky uplands; lava flows
Slope range: 1 to 30 percent
Elevation: 118 to 500 feet (39 to 164 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Typic Haplocryands, deep, 1 to 8 percent slopes, UTM Zone 2, 544685E, 6337731N; on a 2 percent slope at 200 feet (66 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), Bering hairgrass (Deschampsia beringensis), and crowberry (Empetrum nigrum):

Oi—0 to 2.5 inches (0 to 6 cm); dark reddish brown (5YR 3/3) stony peat; many fine and few medium roots; 15 percent stones; slightly acid (pH 6.4); clear smooth boundary.
A—2.5 to 8 inches (6 to 21 cm); very dark brown (7.5YR 2.5/2) medial stony silt loam; weak fine granular structure; very friable; slightly smeary; slightly sticky and slightly plastic; few fine and medium roots; 15 percent stones; slightly acid (pH 6.5); abrupt irregular boundary.
Bw—8 to 21 inches (21 to 54 cm); very dark brown (7.5YR 2.5/3) medial very stony silt loam; weak fine granular structure; very friable; slightly smeary; nonsticky and nonplastic; 10 percent cobbles; 50 percent stones; few fine roots; slightly acid (pH 6.5); gradual irregular boundary.
BC—21 to 39 inches (54 to 100 cm); brown (10YR 4/3) and dark brown (10YR 3/3) medial very stony silt loam; weak fine granular structure; very friable; slightly smeary; slightly sticky and slightly plastic; 10 percent cobbles; 50 percent stones; few fine roots; slightly acid (pH 6.5); gradual wavy boundary.
C—39 to 44 inches (100 to 113 cm); dark olive brown (2.5Y 3/3) medial very stony silt loam; massive; friable; smeary; slightly sticky and slightly plastic; 10 percent cobbles; 25 percent stones; neutral (pH 6.6); abrupt smooth boundary.
2R—44 inches (113 cm); fractured basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 2 to 4 inches (5 to 9 cm)
Surface stoniness: None to stony or very rubbly

O horizon:
Color—hue of 2.5YR, 5YR, or 7.5YR; value of 2.5 or 3; chroma of 1, 2, or 3
Texture—peat, mucky peat (cobbly, stony, and very stony textures can occur)
Content of cobbles—0 to 20 percent
Content of stones—0 to 40 percent
Reaction—very strongly acid to slightly acid

A horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3
Texture—silt loam, fine sandy loam (stony, very stony, and extremely stony textures can occur)
Content of cobbles—0 to 40 percent
Content of stones—0 to 80 percent
Reaction—very strongly acid to slightly acid

Bw horizon:
Color—hue of 5YR, 7.5YR, or 10YR; value of 2.5, 3, or 4; chroma of 2 or 3
Texture—silt loam, very fine sandy loam, fine sandy loam (cobbly, very cobbly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 15 percent
Content of cobbles—0 to 60 percent
Content of stones—0 to 65 percent
Reaction—very strongly acid to slightly acid

BC horizon:
Color—hue of 7.5YR or 10YR; value of 3 or 4; chroma of 2 or 3
Texture—silt loam, very fine sandy loam, fine sandy loam (gravelly, cobbly, very cobbly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 20 percent
Content of cobbles—0 to 35 percent
Content of stones—0 to 65 percent
Reaction—very strongly acid to slightly acid

C horizon:
Color—hue of 7.5YR or 2.5Y; value of 3, 4, or 5; chroma of 2 or 3
Texture—silt loam, very fine sandy loam, fine sandy loam (gravelly, very gravelly, cobbly, stony, and very stony textures can occur)
Content of gravel—0 to 35 percent
Content of cobbles—0 to 20 percent
Content of stones—0 to 50 percent
Reaction—moderately acid to neutral

Typic Vitricryands

Taxonomic Classification

- Typic Vitricryands

Setting

Depth class: Moderately deep or deep (20 inches to 60 inches, 50 cm to 150 cm) to scoria or other pyroclastics
Drainage class: Well drained
Permeability: Rapid over very rapid
Landform or position on the landform: Shoulders, backslopes, and footslopes of volcanic cones
Slope range: 4 to 75 percent
Elevation: 118 to 660 feet (36 to 201 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Typic Vitricryands, 4 to 75 percent slopes, UTM Zone 2, 536200E, 6338756N, backslope of Rush Hill; on a 60 percent slope at 500 feet (152 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), Arctic bluegrass (Poa arctica), and mountain sagewort (Artemisia tilesii):

Oi—0 to 2 inches (0 to 5 cm); dark brown (7.5YR 3/3) peat; many fine roots; moderately acid (pH 6.0); clear smooth boundary.
A—2 to 7.5 inches (5 to 19 cm); dark reddish brown (5YR 3/3 and 2.5/2) very cobbly silt loam; weak fine granular structure; friable; smeary; slightly sticky and slightly plastic; few fine roots; 40 percent cobbles; moderately acid (pH 5.8); gradual smooth boundary.
Bw—7.5 to 16.5 inches (19 to 42 cm); dark brown (7.5YR 3/2) and dark reddish brown (5YR 3/3) very gravelly silt loam; moderate fine subangular blocky structure; friable; slightly smeary; slightly sticky and slightly plastic; 30 percent gravel; 10 percent cobbles; moderately acid (pH 5.8); gradual smooth boundary.
BC—16.5 to 24 inches (42 to 62 cm); very dark grayish brown (10YR 3/2) and dark brown (7.5YR 3/2) very gravelly fine sandy loam; massive; very friable; nonsmeary; nonsticky and nonplastic; 40 percent gravel; moderately acid (pH 5.8); gradual smooth boundary.
2Cr—24 inches (62 cm); dark reddish brown (5YR 2.5/2) scoria and other weathered igneous pyroclastics.

Range in Characteristics

Depth to underlying scoria: 20 to 60 inches (50 to 150 cm)

O horizon:
Color—value and chroma of 2 or 3
Texture—peat, mucky peat (gravelly or cobbly textures can occur)
Reaction—moderately acid or slightly acid

A horizon:
Color—hue of 7.5YR or 5YR; value of 2, 2.5, or 3; chroma of 1, 2, or 3
Texture—silt loam, very fine sandy loam (gravelly, very gravelly, extremely gravelly, cobbly, and very cobbly textures can occur)
Reaction—moderately acid or slightly acid

Bw horizon:
Color—hue of 7.5YR or 5YR; value of 2.5, 3, or 4; chroma of 2 or 3
Texture—very gravelly silt loam, gravelly loam, or very gravelly very fine sandy loam
Reaction—moderately acid or slightly acid

BC horizon:
Color—hue of 5YR, 7.5YR, or 10YR; value of 3 or 4; chroma of 1, 2, 3, or 4
Texture—silt loam, very fine sandy loam, fine sandy loam (very gravelly and extremely gravelly textures can occur)

2C horizon (if it occurs):
Color—value of 2 or 3
Texture—loamy fine sand, sand

2Cr horizon:
Color—hue of 7.5YR or 5YR; value of 1 or 2; chroma of 1, 2, or 2.5

Vitrandic Dystrocryepts

Taxonomic Classification

- Vitrandic Dystrocryepts

Setting

Depth class: Deep (40 to 60 inches, 100 to 150 cm) to bedrock or scoria
Drainage class: Well drained
Permeability: Moderately rapid to very rapid
Landform or position on the landform: Beach terraces, strand plains near the coast
Slope range: 0 to 8 percent
Elevation: 39 to 82 feet (12 to 25 meters)

Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Vitrandic Dystrocryepts, in an area of Humic Vitricryands-Vitrandic Dystrocryepts complex, rolling, UTM Zone 2, 544799E, 6332025N; on an 11 percent slope on the side of a small dune at 60 feet (18 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), mountain foxtail (Alopecurus alpinus), and dunegrass (Elymus mollis):

Oi—0 to 1 inch (0 to 3 cm); dark brown (7.5YR 3/2) peat; many fine roots; moderately acid (pH 6.0); clear smooth boundary.
A—1 to 3 inches (3 to 8 cm); very dark brown (7.5YR 2.5/2) fine sandy loam; weak medium granular structure; very friable; nonsmeary; slightly sticky and slightly plastic; common fine roots; moderately acid (pH 6.0); clear smooth boundary.
2C—3 to 13 inches (8 to 33 cm); dark brown (10YR 3/3) sand; single grain; loose; nonsmeary; nonsticky and nonplastic; few fine roots; slightly acid (pH 6.3); abrupt smooth boundary.
3Bwb1—13 to 21 inches (33 to 52 cm); dark brown (7.5YR 3/3) silt loam; moderate medium subangular blocky structure; friable; very smeary; slightly sticky and slightly plastic; 5 percent cobbles; few fine roots; slightly acid (pH 6.2); clear smooth boundary.
3Bwb2—21 to 34 inches (52 to 86 cm); dark brown (10YR 4/3) silt loam; weak medium subangular blocky structure; very friable; very smeary; slightly sticky and slightly plastic; 5 percent cobbles; few fine roots; slightly acid (pH 6.2); clear smooth boundary.
4C1—34 to 55 inches (86 to 140 cm); very dark grayish brown (2.5Y 3/2) and black (5Y 2.5/1) loamy sand; massive; friable; nonsmeary; nonsticky and nonplastic; neutral (pH 6.7); gradual smooth boundary.
5C2—55 inches (140 cm); dusky red (2.5YR 3/2) scoria.

Range in Characteristics

Thickness of the organic layer: 0.5 inch to 3 inches (1 to 8 cm)
Underlying material: Scoria or basalt bedrock

O horizon:
Color—value and chroma of 2 or 3
Reaction—moderately acid or slightly acid

A horizon:
Color—value of 2 or 2.5
Texture—silt loam, fine sandy loam, mucky fine sandy loam
Reaction—moderately acid or slightly acid

Bw horizon:
Color—hue of 7.5YR or 10YR; value of 3 or 4; chroma of 2 or 3
Texture—silt loam, fine sandy loam, fine sand

3Bw horizon (if it occurs):
Color—value of 3 or 4; chroma of 2 or 3
Texture—fine sandy loam, fine sand

2C, 4C, and 5C horizons:
Color—hue of 2.5Y, 5Y, 2.5YR, 5YR, 7.5YR, or 10YR; value of 2.5, 3, or 4; chroma of 1, 2, or 3
Texture—(textures can be stratified) silt loam, sand (gravelly, very gravelly, extremely gravelly, cobbly, very cobbly, and extremely cobbly textures can occur)
Content of gravel—0 to 65 percent
Content of cobbles—0 to 70 percent

Zapadni Series

Taxonomic Classification

- Sandy, mixed Andic Haplocryods

Setting

Depth class: Very deep (more than 60 inches, 150 cm) to bedrock
Drainage class: Well drained
Permeability: Rapid or very rapid
Landform or position on the landform: Footslopes and backslopes of dipslopes, strand plains and concave plains
Slope range: 1 to 8 percent
Elevation: 60 to 120 feet (20 to 40 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Typical Pedon

Zapadni fine sandy loam, 1 to 8 percent slopes, UTM Zone 2, 550152E, 6337870N; on a 4 percent slope at 60 feet (20 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), dune grass (Elymus arenarius), alpine foxtail (Alopecurus alpinus), mountain timothy (Phleum commutatum), and Bering chickweed (Cerastium beeringianum):

Oi—0 to 2 inches (0 to 5 cm); dark brown (7.5YR 3/4) peat; common fine and medium roots; moderately acid (pH 5.8); clear smooth boundary.
AE—2 to 6 inches (5 to 14 cm); very dark brown (7.5YR 2.5/2) and very dark gray (7.5YR 3/1) fine sandy loam; moderate medium subangular blocky structure parting to moderate thin platy; friable; nonsmeary; nonsticky and nonplastic; common fine and medium roots; moderately acid (pH 5.9); clear smooth boundary.
Bs—6 to 10 inches (14 to 25 cm); dark reddish brown (5YR 3/2) fine sandy loam; weak medium subangular blocky structure; friable; nonsmeary; nonsticky and nonplastic; few fine roots; moderately acid (pH 5.9); gradual smooth boundary.
Bw—10 to 17 inches (25 to 43 cm); dark reddish brown (5YR 3/4) and black (5YR 2/1) loamy sand; weak medium granular structure; very friable; nonsmeary; nonsticky and nonplastic; few fine roots; moderately acid (pH 5.9); clear smooth boundary.
2BC—17 to 30 inches (43 to 75 cm); dark brown (7.5YR 3/3) sand; single grain; loose; nonsmeary; slightly sticky and nonplastic; slightly acid (pH 6.3); clear wavy boundary.
2C—30 to 71 inches (75 to 180 cm); very dark grayish brown (10YR 3/2 and 2.5Y 3/2) sand; single grain; loose; nonsmeary; nonsticky and nonplastic; slightly acid (pH 6.3); abrupt smooth boundary.
3R—71 inches (180 cm); basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 2 to 4 inches (4 to 10 cm)

O horizon:
Color—value of 2.5 or 3; chroma of 1, 2, or 4
Texture—peat, mucky peat

AE horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 1 or 2
Texture—loamy fine sand, fine sandy loam, very fine sandy loam

Bs horizon:
Texture—loamy very fine sand, loamy fine sand, fine sandy loam

Bw horizon:
Color—hue of 5YR or 7.5YR; value of 2 or 3; chroma of 1, 2, 3, or 4
Texture—loamy very fine sand, loamy fine sand, fine sandy loam

2BC horizon:
Reaction—moderately acid or slightly acid

2C horizon:
Color—hue of 10YR or 2.5Y; chroma of 2, 3, or 4
Reaction—moderately acid or slightly acid

Zolotoi Family

Taxonomic Classification

- Medial, amorphic Alic Haplocryands

Setting

Depth class: Moderately deep or deep (20 inches to 60 inches, 50 to 150 cm) to bedrock
Drainage class: Well drained
Permeability: Moderately rapid over moderately slow
Landform or position on the landform: Dipslopes, hummocks, interhummocks
Slope range: 1 to 8 percent
Elevation: 59 to 200 feet (18 to 61 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Representative Pedon

Zolotoi family, in an area of Zolotoi family-Einahnuhto complex, 1 to 8 percent slopes, UTM Zone 2, 535229E, 6336273N; on a 4 percent slope at 200 feet (66 m) elevation in an area supporting Bering hairgrass (Deschampsia beringensis), sedges (Carex spp.), willow (Salix spp.), and crowberry (Empetrum nigrum):

Oi—0 to 2 inches (0 to 5 cm); very dark brown (7.5YR 2.5/3) peat; many fine and very fine roots; moderately acid (pH 5.6); clear wavy boundary.
A—2 to 6 inches (5 to 16 cm); dark reddish brown (5YR 2.5/2) medial very cobbly silt loam; moderate fine granular structure; friable; smeary; slightly sticky and slightly plastic; 5 percent gravel; 40 percent cobbles; 10 percent stones; common fine roots; moderately acid (pH 5.7); clear irregular boundary.
Bw—6 to 12 inches (16 to 31 cm); very dark brown (7.5YR 2.5/2) medial silt loam; weak medium subangular blocky structure; friable; smeary; slightly sticky and slightly plastic; 2 percent gravel; 5 percent cobbles; 5 percent stones; few fine roots; moderately acid (pH 5.7); gradual smooth boundary.

BC—12 to 20 inches (31 to 51 cm); dark brown (7.5YR 3/2) medial silt loam; weak fine subangular blocky structure; very friable; very smeary; slightly sticky and slightly plastic; moderately acid (pH 5.7); gradual smooth boundary.
C1—20 to 26 inches (51 to 65 cm); dark brown (7.5YR 3/3) medial silt loam; weak very thin platy structure; very friable; very smeary; slightly sticky and slightly plastic; moderately acid (pH 5.8); clear wavy boundary.
2C2—26 to 28 inches (65 to 71 cm); very dark grayish brown (10YR 3/2) medial sandy loam; massive; very friable; very smeary; sticky and nonplastic; slightly acid (pH 6.2); abrupt wavy boundary.
3C3—28 to 36 inches (71 to 92 cm); dark brown (10YR 4/3) very gravelly loam; moderate fine subangular blocky structure; firm; nonsmeary; sticky and plastic; slightly acid (pH 6.2); abrupt smooth boundary.
3R—36 inches (92 cm); fractured basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 1 to 4 inches (3 to 10 cm)
Depth to bedrock: 20 to 60 inches (50 to 150 cm)

O horizon:
Color—chroma of 1, 2, or 3
Texture—peat, mucky peat, stony peat, stony mucky peat
Content of gravel—0 to 5 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 15 percent
Reaction—strongly acid or moderately acid

A horizon:
Color—hue of 5YR or 7.5YR; chroma of 2 or 3
Texture—silt loam, very cobbly silt loam
Content of gravel—0 to 5 percent
Content of cobbles—0 to 40 percent
Content of stones—0 to 15 percent
Reaction—strongly acid or moderately acid

Bw horizon:
Color—value of 2.5 or 3
Reaction—strongly acid or moderately acid

BC horizon:
Reaction—strongly acid or moderately acid

C1 horizon:
Color—value of 3 or 4; chroma of 2, 3, or 4
Reaction—strongly acid or moderately acid

2C2 horizon:
Color—hue of 7.5YR or 10YR; value of 3 or 4; chroma of 2, 3, or 4
Texture—loamy sand, sandy loam, gravelly silt loam, gravelly loam
Content of gravel—0 to 25 percent
Content of cobbles—0 to 10 percent
Reaction—slightly acid or neutral

3C3 horizon (if it occurs):
Color—chroma of 3 or 4
Texture—gravelly loam, gravelly clay loam, very gravelly loam
Reaction—slightly acid or neutral

Zolotoi Series

Taxonomic Classification

- Medial, amorphic Alic Haplocryands

Setting

Depth class: Deep (40 to 60 inches, 100 to 150 cm) to bedrock
Drainage class: Well drained
Permeability: Moderately rapid over moderately slow
Landform or position on the landform: Dipslopes, hummocks, interhummocks
Slope range: 1 to 8 percent
Elevation: 39 to 239 feet (12 to 73 meters)
Climatic data (average annual):
Precipitation—19 to 28 inches (48 to 71 cm)
Air temperature—34 to 39 degrees F (1 to 4 degrees C)
Growing degree days—600 to 700

Typical Pedon

Zolotoi silt loam, in an area of Zolotoi complex, 1 to 8 percent slopes, UTM Zone 2, 536347E, 6337186N; on a 4 percent slope at 200 feet (66 m) elevation in an area supporting Nootka lupine (Lupinus nootkatensis), Bering hairgrass (Deschampsia beringensis), and crowberry (Empetrum nigrum):

Oe—0 to 2.5 inches (0 to 6 cm); dark brown (7.5YR 3/3) stony mucky peat; many fine and few medium roots; strongly acid (pH 5.2); clear wavy boundary.
A—2.5 to 5 inches (6 to 13 cm); dark brown (7.5YR 3/2) medial very cobbly silt loam; weak fine granular structure; friable; slightly smeary; sticky and plastic; 5 percent gravel; 5 percent stones; common fine and few medium roots; very strongly acid (pH 4.7); clear wavy boundary.
Bw—5 to 18 inches (13 to 46 cm); dark brown (7.5YR 3/4) medial silt loam; weak thin platy structure; very friable; slightly smeary; sticky and plastic; 5 percent gravel; 5 percent stones; few fine roots;

very strongly acid (pH 4.8); abrupt smooth boundary.
2C1—18 to 21 inches (46 to 53 cm); very dark grayish brown (2.5Y 3/2) and dark olive brown (2.5Y 3/3) medial very fine sandy loam; massive; very friable; very smeary; slightly sticky and slightly plastic; moderately acid (pH 6.0); abrupt smooth boundary.
3C2—21 to 22 inches (53 to 55 cm); reddish brown (5YR 4/4) medial silt loam; massive; very friable; very smeary; slightly sticky and slightly plastic; moderately acid (pH 6.0); abrupt smooth boundary.
3C3—22 to 42 inches (55 to 106 cm); very dark grayish brown (10YR 3/2) and olive brown (2.5Y 4/3) very stony loam; massive; firm; nonsmeary; slightly sticky and slightly plastic; 10 percent gravel; 35 percent stones; slightly acid (pH 6.3); abrupt smooth boundary.
3R—42 inches (106 cm); basalt bedrock.

Range in Characteristics

Thickness of the organic layer: 1 to 4 inches (3 to 10 cm)

O horizon:
Color—value of 2.5 or 3; chroma of 1, 2, or 3
Texture—peat, mucky peat (stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 5 percent
Content of cobbles—0 to 35 percent
Content of stones—0 to 65 percent

A horizon:
Color—hue of 5YR or 7.5YR; value of 2.5 or 3; chroma of 2 or 3
Texture—silt loam (gravelly, cobbly, very cobbly, stony, very stony, and extremely stony textures can occur)
Content of gravel—0 to 15 percent
Content of cobbles—0 to 45 percent
Content of stones—0 to 65 percent

Bw horizon:
Color—value of 3 or 4; chroma of 2, 3, or 4
Content of gravel—0 to 10 percent
Content of cobbles—0 to 10 percent
Content of stones—0 to 10 percent

2C1 horizon:
Color—hue of 2.5Y, 7.5YR, or 10YR; value of 3 or 4; chroma of 2, 3, or 4
Texture—silt loam, gravelly silt loam, very fine sandy loam, gravelly very fine sandy loam
Content of gravel—0 to 25 percent
Content of cobbles—0 to 10 percent
Reaction—moderately acid or slightly acid

3C2 horizon:
Reaction—moderately acid or slightly acid

3C3 horizon:
Color—hue of 7.5YR, 10YR, 2.5Y, or 5Y; value of 3, 4, or 5; chroma of 2, 3, or 4
Texture—silt loam, loam (gravelly, very gravelly, cobbly, stony, and very stony textures can occur)
Content of gravel—10 to 35 percent
Content of cobbles—0 to 15 percent
Content of stones—0 to 30 percent
Reaction—moderately acid or slightly acid

Formation of the Soils

Soil is the unconsolidated mineral and organic material on the surface of the earth that serves as a natural medium for the growth of land plants (USDA, 1999). Because soil has been subjected to and influenced by numerous physical and chemical weathering processes, it differs from the material from which it was derived in many physical, chemical, and morphological properties. Soil formation is controlled by genetic and environmental factors of climate (including temperature and moisture effects), topography, parent material, and living organisms all acting over a period of time. The influence of any one of these factors varies from place to place, and the interaction of all of them determines the kind of soil that forms (Jenny, 1941).

The soils of Saint Paul Island are the result of interactions between a cold moist maritime climate, easily weatherable volcanic materials, resistant sands, and decomposing plant tissue. Thickness of the parent materials over bedrock ranges from very shallow to very deep and is related to many factors, including topographic position, wind direction, and the size of the particles involved. In some areas, soils formed in the basalt rock; these are called residual soils. The thickness of residual soils depends on the duration and intensity of the soil-forming processes.

The dominant soil-forming processes on Saint Paul Island are the accumulation of organic matter, the formation and stabilization of organic complexes in the upper horizons, *in situ* weathering and formation of noncrystalline minerals in deeper horizons, oxidation and reduction of iron, and cryoturbation. Not all processes occur in all soils.

Organic matter accumulates on the surface when additions of plant material exceed the rate of decomposition. The warmer, drier soils on Saint Paul Island accumulate a thin organic surface layer. Inhibited decomposition in the wetter, colder soils results in accumulation of thick organic layers. Soils with thick organic layers on Saint Paul Island occur in areas where drainage is poor, for example, at the base of some upland areas and at the margins of lakes and ponds.

In many soils that formed in volcanic material, organic matter forms stable complexes with aluminum and iron and is retained and endures in the upper mineral (A) horizons. This characteristic is typical of Andisols. In other types of soil, organic matter forms mobile complexes with aluminum and iron. Translocation of these complexes from the upper part of the profile deeper into the soil can result in the formation of a gray, depleted E horizon above an enriched reddish Bs horizon. This morphology is characteristic of Spodosols. Spodosols on Saint Paul Island tend to occur at the base of long slopes in coarse textured materials. Translocation is a less important process in Andisols with regard to formation of subsurface horizons. *In situ* weathering of glassy volcanic material results in formation of noncrystalline minerals with unique chemical properties.

In general, the soils on Saint Paul Island are well drained and well aerated. In these conditions, iron released from primary minerals is oxidized to form a reddish brown Bw horizon. In the poorly drained soils on Saint Paul Island, iron is reduced in the presence of organic material and low oxygen content. This reduction results in the formation of gray soil colors. Some soils cycle between wet and dry conditions, and iron is alternately reduced and oxidized. This process results in a mottled gray and red soil color.

Soil processes related to freezing and thawing result in the formation of distinct soil properties. A stony surface is common on the dipslopes on Saint Paul Island because of the ejection of stones by frost heave. Solifluction lobes are very common on the side slopes of the volcanic cinder cones. These lobes probably formed when thawed material on steep side slopes slid over a frozen layer. Elsewhere on the island, evidence of cryoturbation, or frost churning, is common in many soil profiles in the form of disrupted soil horizons, oriented rocks, and earth hummocks. Cryoturbation occurs mainly in soils with permafrost, which does not occur presently on Saint Paul Island. Some of the features associated with cryoturbation may be relict from a time when permafrost was common.

References

American Association of State Highway and Transportation Officials (AASHTO). 1998. Standard specifications for transportation materials and methods of sampling and testing. 19th edition, 2 volumes.

American Society for Testing and Materials (ASTM). 1998. Standard classification of soils for engineering purposes. ASTM Standard D 2487.

Barth, T.F.W. 1956. U.S. Geological Survey Bulletin 1028-F.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. February 24, 1995. Hydric soils of the United States.

Hopkins, D.M. 1959. Cenozoic history of the Bering land bridge. Science 129: 1519-1527.

Hopkins, D.M., and T. Einarsson. 1966. Pleistocene glaciation on St. George, Pribilof Islands. Science 152: 343-345.

Hurt, G.W., P.M. Whited, and R.F. Pringle, editors. 1996. Field indicators of hydric soils in the United States.

Jenny, H. 1941. Factors of soil formation.

Lea, P.D., and C.F. Waythomas. 1990. Late Pleistocene sand sheets in Alaska. Quaternary Research 34: 269-281.

National Research Council. 1995. Wetlands: characteristics and boundaries.

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. United States Army Corps of Engineers Waterways Experiment Station, Vicksburg, MS. Technical Report Y-87-1.

United States Department of Agriculture. 1993. Soil survey manual. Soil Conservation Service, Soil Survey Division Staff. U.S. Department of Agriculture Handbook 18.

United States Department of Agriculture. 1997. National range and pasture handbook (revised). Natural Resources Conservation Service, Grazing Lands Technology Institute.

United States Department of Agriculture. 1998a. Field indicators of hydric soils in the United States. Version 4.0. Natural Resources Conservation Service, G.W. Hurt, P.M. Whited, and R.F. Pringle, editors.

United States Department of Agriculture. 1998b. Keys to soil taxonomy. Eighth edition. Natural Resources Conservation Service, Soil Survey Staff.

United States Department of Agriculture. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Second Edition. Natural Resources Conservation Service, Soil Survey Staff, U.S. Department of Agriculture Handbook 436.

Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Aspect. The direction in which a slope faces.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope. A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions. Low-chroma zones having a low content of iron, manganese, and clay because of the chemical reduction of iron and manganese

and the removal of iron, manganese, and clay. A type of redoximorphic depletion.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Closed depression. A low area completely surrounded by higher ground and having no natural outlet.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cryoturbation (frost churning). The mixing of the soil caused by frost action, resulting in irregular or broken horizons, organic matter accumulation on the permafrost table, and oriented rock fragments.

Delineation. An individual polygon shown by a closed boundary on a soil map. Defines the area, shape, and location of a map unit on the landscape.

Depth, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Dipslope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion. The wearing away of the land surface by

water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fine textured soil. Sandy clay, silty clay, or clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Footslope. The position that forms the inner, gently inclined surface at the base of a hillslope. In profile, footslopes are commonly concave. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb. Any herbaceous plant not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Ground water. Water filling all the unblocked pores of the material below the water table.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of

transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intercalated. Inserted among others, as a bed or strata of a particular material between layers of other material.

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

Iron depletions. Low-chroma zones having a low content of iron and manganese oxide because of chemical reduction and removal, but having a clay content similar to that of the adjacent matrix. A type of redoximorphic depletion.

K_{sat}. Saturated hydraulic conductivity. (See Permeability.)

Leaching. The removal of soluble material from soil or other material by percolating water.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redoximorphic concentration.

Medial. Referring to material that has andic soil properties and has a 15-bar water content of less than 100 percent in undried samples and of 12 percent or more in air-dried samples.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition,

or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Muskeg. Wetland in boreal regions dominated by sphagnum moss, stunted black spruce, and low shrubs.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nose slope. A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The movement of water through the soil.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
Very slow	0.01 to 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between

the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Pyroclastic. Pertaining to fragmental materials produced by explosive, aerial ejection of clastic particles from a volcanic vent. Such materials may accumulate on land or under water.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Redoximorphic concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redoximorphic depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redoximorphic features. Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

Reduced matrix. A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redoximorphic feature.

Regolith. All unconsolidated earth materials above the solid bedrock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Riser. The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scoria. Vesicular rock fragments larger than 2

millimeters in at least one dimension and having a specific gravity of more than 2.0.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shoulder. The position that forms the uppermost inclined surface near the top of a hillslope. It is a transition from backslope to summit. The surface is dominantly convex in profile and erosional in origin.

Side slope. A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solifluction. Slow, viscous downslope flow of water-saturated regolith. Rates of flow vary widely.

Solifluction lobe. An isolated tongue-shaped feature up to 82 feet (25 meters) wide and 492 feet (150 meters) or more long, formed by rapid solifluction on certain sections of a slope showing variations in gradient. This feature commonly has a steep (15 to 60 degrees) front and a relatively smooth upper surface.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Strand line. The shoreline, especially a former (relict) shoreline, now elevated above the present water level. Commonly appears as a bench or line wrapping around the landscape at a common elevation.

Strand plain. A prograded shore built seaward by waves and currents, and continuous for some distance along the coast. It is characterized by subparallel beach ridges and swales, in places with associated dunes.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Summit. The topographically highest position of a

hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Toeslope. The position that forms the gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Tread. The relatively flat terrace surface that was cut or built by stream or wave action.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Tussock. A small mound, typically 0.5 foot to 1.0 foot (15 to 30 cm) high, consisting of densely packed dead parts of sedges or grasses.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Volcanic cone. A conical hill of lava and/or pyroclastics that is built up around a volcanic vent.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1949-96 at Saint Paul Island, Alaska)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	30.4	22.2	26.3	41	-2	0	1.67	0.91	2.33	5	10.0
February---	27.0	18.1	22.5	40	-8	0	1.31	.53	1.97	4	9.4
March------	28.9	19.3	24.1	40	-6	0	1.19	.52	1.76	3	9.6
April------	32.6	23.8	28.2	43	2	0	1.17	.52	1.73	3	5.8
May--------	39.3	31.2	35.3	49	19	4	1.25	.86	1.60	4	2.2
June-------	45.8	37.1	41.4	56	26	64	1.26	.52	1.89	3	.1
July-------	49.9	42.5	46.2	59	32	191	2.08	1.20	2.86	5	.0
August-----	51.3	44.6	47.9	59	33	243	3.14	1.81	4.32	8	.0
September--	48.8	40.4	44.6	55	27	142	2.87	1.78	3.85	8	.0
October----	42.1	33.8	38.0	50	20	28	2.88	1.93	3.75	8	2.4
November---	37.1	29.2	33.2	45	12	3	2.75	1.77	3.64	8	7.1
December---	32.9	24.7	28.8	42	5	0	2.03	1.15	2.81	7	9.0
Yearly:											
Average---	38.8	30.6	34.7	---	---	---	---	---	---	---	---
Extreme---	66	-19	---	61	-10	---	---	---	---	---	---
Total-----	---	---	---	---	---	676	23.58	18.59	27.58	66	55.6

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1949-97 at Saint Paul Island, Alaska)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	June 5	June 19	July 8
2 years in 10 later than--	May 26	June 11	June 30
5 years in 10 later than--	May 8	May 28	June 16
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 4	Sept. 15	Aug. 29
2 years in 10 earlier than--	Oct. 11	Sept. 21	Sept. 4
5 years in 10 earlier than--	Oct. 25	Oct. 3	Sept. 16

Table 3.--Growing Season

(Recorded in the period 1949-97 at Saint Paul Island, Alaska)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	128	95	59
8 years in 10	142	106	70
5 years in 10	169	127	91
2 years in 10	196	148	112
1 year in 10	210	159	123

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
1	Aquic Dystrocryepts, 0 to 3 percent slopes	545	2.0
2	Aquic Haplocryands-Andic Haplocryods complex, 1 to 8 percent slopes	237	0.9
3	Beaches, rocky	241	0.9
4	Beaches, sandy	493	1.8
5	Beaches, tidal	25	*
6	Bogoslof silt loam, 0 to 3 percent slopes	541	2.0
7	Cryofluvents-Spodic Dystrocryepts complex, 1 to 8 percent slopes	64	0.2
8	Dumps, landfill	20	*
9	Einahnuhto silty clay loam-Andic Haplocryods, rubbly, complex, 1 to 8 percent slopes	2,266	8.4
10	Histic Cryaquepts-Terric Cryohemists complex, 0 to 3 percent slopes	61	0.2
11	Histic Cryaquepts-Typic Cryaquents complex, tidal, 0 to 3 percent slopes	24	*
12	Humic Vitricryands-Vitrandic Dystrocryepts complex, rolling	854	3.2
13	Lithic Cryofolists-Rock outcrop complex, 4 to 16 percent slopes	375	1.4
14	Lithic Haplocryands, gravelly, complex, 1 to 30 percent slopes	530	2.0
15	Lithic Haplocryands, rubbly-Typic Haplocryands, moderately deep-Rock outcrop complex, 1 to 8 percent slopes	2,443	9.0
16	Lukanin sand, 1 to 60 percent slopes	2,567	9.5
17	Pits, quarry	74	0.3
18	Polovina fine sandy loam, 0 to 3 percent slopes	1,578	5.8
19	Polovina fine sandy loam, 1 to 8 percent slopes	932	3.5
20	Polovina family, moderately deep, 1 to 8 percent slopes	65	0.2
21	Polovina family, very deep, 4 to 16 percent slopes	293	1.1
22	Polovina family, very deep, 10 to 30 percent slopes	220	0.8
23	Rock outcrop, basalt	130	0.5
24	Tsammana sand, 1 to 8 percent slopes	1,063	3.9
25	Tsammana sand-Lithic Cryorthents complex, 0 to 3 percent slopes	826	3.1
26	Typic Cryaquents, sandy, 0 to 3 percent slopes	119	0.4
27	Typic Cryaquents, mucky-Terric Cryohemists complex, 0 to 3 percent slopes	19	*
28	Typic Dystrocryepts complex, undulating	1,198	4.4
29	Typic Eutrocryepts, 4 to 16 percent slopes	13	*
30	Typic Haplocryands, deep, 1 to 8 percent slopes	299	1.1
31	Typic Haplocryands, moderately deep-Lithic Haplocryands, rubbly, complex, 1 to 8 percent slopes	3.368	12.5
32	Typic Vitricryands, 4 to 75 percent slopes	45	0.2
33	Typic Vitricryands, 45 to 70 percent slopes	1,683	6.2
34	Urban land	160	0.6
35	Zapadni fine sandy loam, 1 to 8 percent slopes	686	2.5
36	Zolotoi complex, 1 to 8 percent slopes	667	2.5
37	Zolotoi family-Einahnuhto complex, 1 to 8 percent slopes	619	2.3
38	Water	1,657	6.1
	Total	27,000	100.0

* Less than 0.1 percent.

Table 5.--Recreation: Foot and ATV Trails

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
1:			
Aquic Dystrocryepts	85	Not limited	
2:			
Aquic Haplocryands	55	Somewhat limited	
		Content of large stones	0.50
		Silty surface layer dusty when dry and slippery when wet	0.50
Andic Haplocryods	45	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
		Content of large stones	0.18
3:			
Beaches, rocky	95	Not rated	
4:			
Beaches, sandy	95	Not rated	
5:			
Beaches, tidal	100	Not rated	
6:			
Bogoslof silt loam	85	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
7:			
Cryofluvents	45	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
Spodic Dystrocryepts	45	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
8:			
Dumps, landfill	100	Not rated	
9:			
Einahnuhto silty clay loam	50	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
Andic Haplocryods, rubbly	45	Not limited	

Table 5.--Recreation: Foot and ATV Trails--Continued

Map symbol and soil name	Pct. of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
10:			
Histic Cryaquepts, sandy	70	Very limited	
		Excess surface organic matter	1.00
		Ponding	1.00
		Depth to saturated zone	1.00
		Sandy surface layer easily displaced	0.50
Terric Cryohemists, sandy	20	Very limited	
		Excess surface organic matter	1.00
		Ponding	1.00
		Sandy surface layer easily displaced	0.50
		Depth to saturated zone	0.22
11:			
Histic Cryaquepts, tidal	50	Very limited	
		Excess surface organic matter	1.00
		Flooding	0.60
		Depth to saturated zone	0.50
		Sandy surface layer easily displaced	0.50
Typic Cryaquents, tidal	50	Very limited	
		Depth to saturated zone	1.00
		Flooding	0.60
		Sandy surface layer easily displaced	0.50
12:			
Humic Vitricryands	50	Not limited	
Vitrandic Dystrocryepts	40	Not limited	
13:			
Lithic Cryofolists	60	Very limited	
		Excess surface organic matter	1.00
Rock outcrop	40	Not rated	
14:			
Lithic Haplocryands, gravelly, 10 to 30 percent slopes	50	Not limited	
Lithic Haplocryands, gravelly, 1 to 8 percent slopes	35	Not limited	
15:			
Lithic Haplocryands, rubbly	45	Very limited	
		Content of large stones	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Typic Haplocryands, moderately deep	30	Very limited	
		Content of large stones	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
Rock outcrop	20	Not rated	

Table 5.--Recreation: Foot and ATV Trails--Continued

Map symbol and soil name	Pct. of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
16:			
Lukanin sand	80	Somewhat limited	
		Sandy surface layer easily displaced	0.50
17:			
Pits, quarry	100	Not rated	
18:			
Polovina fine sandy loam	80	Not limited	
19:			
Polovina fine sandy loam	85	Not limited	
20:			
Polovina family, moderately deep	75	Not limited	
21:			
Polovina family, very deep	90	Somewhat limited	
		Sandy surface layer easily displaced	0.50
22:			
Polovina family, very deep	85	Somewhat limited	
		Sandy surface layer easily displaced	0.50
23:			
Rock outcrop, basalt	100	Not rated	
24:			
Tsammana sand	75	Somewhat limited	
		Sandy surface layer easily displaced	0.50
25:			
Tsammana sand	45	Somewhat limited	
		Sandy surface layer easily displaced	0.50
Lithic Cryorthents	40	Somewhat limited	
		Sandy surface layer easily displaced	0.50
26:			
Typic Cryaquents, sandy	85	Very limited	
		Ponding	1.00
		Depth to saturated zone	1.00
		Sandy surface layer easily displaced	0.50
27:			
Typic Cryaquents, mucky	45	Very limited	
		Ponding	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50

Table 5.--Recreation: Foot and ATV Trails--Continued

Map symbol and soil name	Pct. of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
27:			
Terric Cryohemists, loamy-----	40	Very limited	
		Excess surface organic matter	1.00
		Ponding	1.00
		Depth to saturated zone	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
28:			
Typic Dystrocryepts, deep-----	50	Somewhat limited	
		Sandy surface layer easily displaced	0.50
Typic Dystrocryepts, moderately deep----------	40	Not limited	
29:			
Typic Eutrocryepts----------	90	Somewhat limited	
		Sandy surface layer easily displaced	0.50
30:			
Typic Haplocryands, deep------	80	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
31:			
Typic Haplocryands, moderately deep-------------------------	45	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
		Content of large stones	0.18
Lithic Haplocryands, rubbly---	40	Very limited	
		Content of large stones	1.00
		Silty surface layer dusty when dry and slippery when wet	0.50
32:			
Typic Vitricryands----------	90	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
33:			
Typic Vitricryands----------	85	Somewhat limited	
		Silty surface layer dusty when dry and slippery when wet	0.50
34:			
Urban land----------	100	Not rated	
35:			
Zapadni fine sandy loam-------	90	Not limited	

Table 5.--Recreation: Foot and ATV Trails--Continued

Map symbol and soil name	Pct. of map unit	Foot and ATV trails (Alaska criteria)	
		Rating class and limiting features	Value
36:			
Zolotoi silt loam	60	Somewhat limited Silty surface layer dusty when dry and slippery when wet	0.50
Zolotoi silt loam, very stony	30	Somewhat limited Content of large stones Silty surface layer dusty when dry and slippery when wet	0.92 0.50
37:			
Zolotoi family	60	Somewhat limited Content of large stones Silty surface layer dusty when dry and slippery when wet	0.50 0.50
Einahnuhto silty clay loam	40	Somewhat limited Silty surface layer dusty when dry and slippery when wet	0.50
38:			
Water	100	Not rated	

Table 6.--Building Site Development: Structures

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Dwellings without basements (Alaska criteria)		Dwellings with basements (Alaska criteria)		Small commercial buildings (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1:							
Aquic Dystrocryepts-	85	Somewhat limited		Very limited		Somewhat limited	
		Depth to saturated zone	0.57	Depth to saturated zone	1.00	Depth to saturated zone	0.57
				Depth to hard bedrock	0.08		
2:							
Aquic Haplocryands--	55	Somewhat limited		Very limited		Somewhat limited	
		Content of large stones	0.88	Depth to hard bedrock	1.00	Content of large stones	0.88
		Depth to hard bedrock	0.57	Content of large stones	0.88	Depth to hard bedrock	0.57
						Slope	0.12
Andic Haplocryods---	45	Very limited		Very limited		Very limited	
		Content of large stones	1.00	Content of large stones	1.00	Content of large stones	1.00
				Depth to hard bedrock	0.11	Slope	0.12
3:							
Beaches, rocky------	95	Not rated		Not rated		Not rated	
4:							
Beaches, sandy------	95	Not rated		Not rated		Not rated	
5:							
Beaches, tidal------	100	Not rated		Not rated		Not rated	
6:							
Bogoslof silt loam--	85	Not limited		Not limited		Not limited	
7:							
Cryofluvents--------	45	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
						Slope	0.12
Spodic Dystrocryepts	45	Not limited		Not limited		Somewhat limited	
						Slope	0.12
8:							
Dumps, landfill-----	100	Not rated		Not rated		Not rated	
9:							
Einahnuhto silty clay loam----------	50						
	50	Somewhat limited		Very limited		Somewhat limited	
		Shrink-swell	0.50	Depth to hard bedrock	1.00	Shrink-swell	0.50
		Depth to hard bedrock	0.01	Shrink-swell	0.50	Slope	0.12
						Depth to hard bedrock	0.01

Table 6.--Building Site Development: Structures--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements (Alaska criteria)		Dwellings with basements (Alaska criteria)		Small commercial buildings (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9:							
Andic Haplocryods, rubbly	45	Somewhat limited		Very limited		Somewhat limited	
		Content of large stones	0.74	Depth to hard bedrock	1.00	Content of large stones	0.74
		Depth to hard bedrock	0.35	Content of large stones	0.74	Depth to hard bedrock	0.35
						Slope	0.12
10:							
Histic Cryaquepts, sandy	70	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Terric Cryohemists, sandy	20	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Content of organic matter	1.00	Subsidence	1.00	Content of organic matter	1.00
		Subsidence	1.00	Depth to saturated zone	1.00	Subsidence	1.00
		Depth to saturated zone	0.93			Depth to saturated zone	0.93
11:							
Histic Cryaquepts, tidal	50	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Typic Cryaquents, tidal	50	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
12:							
Humic Vitricryands	50	Not limited		Not limited		Not limited	
Vitrandic Dystrocryepts	40	Somewhat limited		Somewhat limited		Very limited	
		Moderately limiting slope	0.13	Moderately limiting slope	0.13	Slope	1.00
13:							
Lithic Cryofolists	60	Very limited		Very limited		Very limited	
		Content of organic matter	1.00	Content of organic matter	1.00	Content of organic matter	1.00
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to hard bedrock	1.00
		Content of large stones	0.81	Content of large stones	0.81	Content of large stones	0.81
						Slope	0.12
Rock outcrop	40	Not rated		Not rated		Not rated	

Table 6.--Building Site Development: Structures--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements (Alaska criteria)		Dwellings with basements (Alaska criteria)		Small commercial buildings (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
14:							
Lithic Haplocryands, gravelly, 10 to 30 percent slopes	50	Very limited Depth to hard bedrock Very limiting slope	 1.00 1.00	Very limited Depth to hard bedrock Very limiting slope	 1.00 1.00	Very limited Slope Depth to hard bedrock	 1.00 1.00
Lithic Haplocryands, gravelly, 1 to 8 percent slopes	35	Very limited Depth to hard bedrock	 1.00	Very limited Depth to hard bedrock	 1.00	Very limited Depth to hard bedrock	 1.00
15:							
Lithic Haplocryands, rubbly	45	Very limited Content of large stones Depth to hard bedrock	 1.00 1.00	Very limited Depth to hard bedrock Content of large stones	 1.00 1.00	Very limited Content of large stones Depth to hard bedrock Slope	 1.00 1.00 0.12
Typic Haplocryands, moderately deep	30	Very limited Content of large stones Depth to hard bedrock	 1.00 0.01	Very limited Depth to hard bedrock Content of large stones	 1.00 1.00	Very limited Content of large stones Slope Depth to hard bedrock	 1.00 0.12 0.01
Rock outcrop	20	Not rated		Not rated		Not rated	
16:							
Lukanin sand	80	Somewhat limited Moderately limiting slope	 0.99	Somewhat limited Moderately limiting slope	 0.99	Very limited Slope	 1.00
17:							
Pits, quarry	100	Not rated		Not rated		Not rated	
18:							
Polovina fine sandy loam	80	Not limited		Somewhat limited Depth to hard bedrock	 0.08	Not limited	
19:							
Polovina fine sandy loam	85	Not limited		Somewhat limited Depth to hard bedrock	 0.08	Somewhat limited Slope	 0.12
20:							
Polovina family, moderately deep	75	Somewhat limited Depth to hard bedrock	 0.10	Very limited Depth to hard bedrock	 1.00	Somewhat limited Depth to hard bedrock	 0.10

Table 6.--Building Site Development: Structures--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements (Alaska criteria)		Dwellings with basements (Alaska criteria)		Small commercial buildings (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
21: Polovina family, very deep	90	Somewhat limited Moderately limiting slope	0.63	Somewhat limited Moderately limiting slope	0.63	Very limited Slope	1.00
22: Polovina family, very deep	85	Very limited Very limiting slope	1.00	Very limited Very limiting slope	1.00	Very limited Slope	1.00
23: Rock outcrop, basalt	100	Not rated		Not rated		Not rated	
24: Tsammana sand	75	Somewhat limited Content of large stones	0.52	Somewhat limited Content of large stones Depth to hard bedrock	0.52 0.04	Somewhat limited Content of large stones	0.52
25: Tsammana sand	45	Somewhat limited Content of large stones	0.77	Somewhat limited Content of large stones Depth to hard bedrock	0.77 0.04	Somewhat limited Content of large stones	0.77
Lithic Cryorthents	40	Very limited Depth to hard bedrock Content of large stones	1.00 1.00	Very limited Depth to hard bedrock Content of large stones	1.00 1.00	Very limited Depth to hard bedrock Content of large stones	1.00 1.00
26: Typic Cryaquents, sandy	85	Very limited Ponding Depth to saturated zone	1.00 1.00	Very limited Ponding Depth to saturated zone	1.00 1.00	Very limited Ponding Depth to saturated zone	1.00 1.00
27: Typic Cryaquents, mucky	45	Very limited Ponding	1.00	Very limited Ponding	1.00	Very limited Ponding	1.00
Terric Cryohemists, loamy	40	Very limited Ponding Subsidence Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Subsidence Depth to saturated zone	1.00 1.00 1.00	Very limited Ponding Subsidence Depth to saturated zone	1.00 1.00 1.00

Table 6.--Building Site Development: Structures--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements (Alaska criteria)		Dwellings with basements (Alaska criteria)		Small commercial buildings (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
28:							
Typic Dystrocryepts, deep	50	Somewhat limited Content of large stones	0.23	Somewhat limited Depth to hard bedrock Content of large stones	0.84 0.23	Somewhat limited Content of large stones Slope	0.23 0.12
Typic Dystrocryepts, moderately deep	40	Somewhat limited Content of large stones Depth to hard bedrock	0.69 0.20	Very limited Depth to hard bedrock Content of large stones	1.00 0.69	Somewhat limited Content of large stones Depth to hard bedrock Slope	0.69 0.20 0.12
29:							
Typic Eutrocryepts	90	Somewhat limited Moderately limiting slope	0.63	Somewhat limited Depth to hard bedrock Moderately limiting slope	0.82 0.63	Very limited Slope	1.00
30:							
Typic Haplocryands, deep	80	Somewhat limited Content of large stones	0.99	Very limited Content of large stones Depth to hard bedrock	0.99 0.86	Very limited Content of large stones	0.99
31:							
Typic Haplocryands, moderately deep	45	Very limited Content of large stones Depth to hard bedrock	1.00 0.64	Very limited Depth to hard bedrock Content of large stones	1.00 1.00	Very limited Content of large stones Slope Depth to hard bedrock	1.00 1.00 0.64
Lithic Haplocryands, rubbly	40	Very limited Depth to hard bedrock Content of large stones	1.00 1.00	Very limited Depth to hard bedrock Content of large stones	1.00 1.00	Very limited Depth to hard bedrock Content of large stones Slope	1.00 1.00 0.47
32:							
Typic Vitricryands	90	Very limited Very limiting slope	1.00	Very limited Very limiting slope	1.00	Very limited Slope	1.00
33:							
Typic Vitricryands	85	Very limited Very limiting slope	1.00	Very limited Very limiting slope	1.00	Very limited Slope	1.00
34:							
Urban land	100	Not rated		Not rated		Not rated	

Table 6.--Building Site Development: Structures--Continued

Map symbol and soil name	Pct. of map unit	Dwellings without basements (Alaska criteria)		Dwellings with basements (Alaska criteria)		Small commercial buildings (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
35:							
Zapadni fine sandy loam	90	Not limited		Not limited		Somewhat limited	
						Slope	0.12
36:							
Zolotoi silt loam	60	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.01	Depth to hard bedrock	1.00	Slope	0.12
						Depth to hard bedrock	0.01
Zolotoi silt loam, very stony	30	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.57	Depth to hard bedrock	1.00	Depth to hard bedrock	0.57
		Content of large stones	0.16	Content of large stones	0.16	Content of large stones	0.16
						Slope	0.12
37:							
Zolotoi family	60	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.05	Depth to hard bedrock	1.00	Slope	0.12
						Depth to hard bedrock	0.05
Einahnuhto silty clay loam	40	Somewhat limited		Very limited		Somewhat limited	
		Depth to hard bedrock	0.92	Depth to hard bedrock	1.00	Depth to hard bedrock	0.92
		Shrink-swell	0.50	Shrink-swell	0.50	Shrink-swell	0.50
						Slope	0.12
38:							
Water	100	Not rated		Not rated		Not rated	

Table 7.--Building Site Development: Site Improvements

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1:							
Aquic Dystrocryepts-	85	Somewhat limited		Very limited		Somewhat limited	
		Frost action	0.50	Cutbanks cave	1.00	Depth to saturated zone	0.02
		Depth to saturated zone	0.07	Depth to saturated zone	1.00	Droughty	0.01
				Depth to hard bedrock	0.08		
2:							
Aquic Haplocryands--	55	Very limited		Very limited		Very limited	
		Frost action	1.00	Depth to hard bedrock	1.00	Content of large stones	1.00
		Content of large stones	0.88	Content of large stones	0.88	Depth to bedrock	0.57
		Depth to hard bedrock	0.57	Cutbanks cave	0.10		
Andic Haplocryods---	45	Very limited		Very limited		Very limited	
		Frost action	1.00	Content of large stones	1.00	Content of large stones	1.00
		Content of large stones	1.00	Depth to hard bedrock	0.11		
				Cutbanks cave	0.10		
3:							
Beaches, rocky------	95	Not rated		Not rated		Not rated	
4:							
Beaches, sandy------	95	Not rated		Not rated		Not rated	
5:							
Beaches, tidal------	100	Not rated		Not rated		Not rated	
6:							
Bogoslof silt loam--	85	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
7:							
Cryofluvents--------	45	Somewhat limited		Very limited		Not limited	
		Frost action	0.50	Cutbanks cave	1.00		
		Flooding	0.40				
Spodic Dystrocryepts	45	Somewhat limited		Very limited		Very limited	
		Frost action	0.50	Cutbanks cave	1.00	Too sandy	1.00
8:							
Dumps, landfill-----	100	Not rated		Not rated		Not rated	

Table 7.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9:							
Einahnuhto silty clay loam	50	Very limited		Very limited		Somewhat limited	
		Low strength	1.00	Depth to hard bedrock	1.00	Depth to bedrock	0.01
		Shrink-swell	0.50	Cutbanks cave	0.10		
		Frost action	0.50				
		Depth to hard bedrock	0.01				
Andic Haplocryods, rubbly	45	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Depth to hard bedrock	1.00	Content of large stones	0.68
		Content of large stones	0.74	Content of large stones	0.74	Depth to bedrock	0.35
		Depth to hard bedrock	0.35	Cutbanks cave	0.10		
10:							
Histic Cryaquepts, sandy	70	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Cutbanks cave	1.00	Excess surface organic matter	1.00
		Frost action	0.50	Depth to saturated zone	1.00	Depth to saturated zone	1.00
Terric Cryohemists, sandy	20	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Subsidence	1.00	Cutbanks cave	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	0.64	Depth to saturated zone	1.00	Depth to saturated zone	0.60
				Content of organic matter	1.00		
11:							
Histic Cryaquepts, tidal	50	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	0.79	Cutbanks cave	1.00	Excess surface organic matter	1.00
		Frost action	0.50	Depth to saturated zone	1.00	Depth to saturated zone	0.78
Typic Cryaquents, tidal	50	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Cutbanks cave	1.00	Depth to saturated zone	1.00
		Frost action	0.50	Depth to saturated zone	1.00	Droughty	0.97
12:							
Humic Vitricryands	50	Very limited		Very limited		Not limited	
		Frost action	1.00	Cutbanks cave	1.00		
Vitrandic Dystrocryepts	40	Somewhat limited		Very limited		Very limited	
		Frost action	0.50	Cutbanks cave	1.00	Slope	1.00
		Moderately limiting slope	0.13	Moderately limiting slope	0.13		

Table 7.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
13:							
Lithic Cryofolists--	60	Very limited		Very limited		Very limited	
		Frost action	1.00	Depth to hard bedrock	1.00	Excess surface organic matter	1.00
		Depth to hard bedrock	1.00	Content of large stones	0.81	Depth to bedrock	1.00
		Content of large stones	0.81	Cutbanks cave	0.10	Content of large stones	0.32
Rock outcrop--------	40	Not rated		Not rated		Not rated	
14:							
Lithic Haplocryands, gravelly, 10 to 30 percent slopes-----	50	Very limited		Very limited		Very limited	
		Frost action	1.00	Depth to hard bedrock	1.00	Depth to bedrock	1.00
		Depth to hard bedrock	1.00	Very limiting slope	1.00	Slope	1.00
		Very limiting slope	1.00	Cutbanks cave	0.10	Droughty	0.31
Lithic Haplocryands, gravelly, 1 to 8 percent slopes-----	35	Very limited		Very limited		Very limited	
		Frost action	1.00	Depth to hard bedrock	1.00	Depth to bedrock	1.00
		Depth to hard bedrock	1.00	Cutbanks cave	0.10	Droughty	0.37
15:							
Lithic Haplocryands, rubbly----------	45	Very limited		Very limited		Very limited	
		Content of large stones	1.00	Depth to hard bedrock	1.00	Content of large stones	1.00
		Depth to hard bedrock	1.00	Content of large stones	1.00	Depth to bedrock	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	0.20
Typic Haplocryands, moderately deep----	30	Very limited		Very limited		Very limited	
		Content of large stones	1.00	Depth to hard bedrock	1.00	Content of large stones	1.00
		Frost action	0.50	Content of large stones	1.00	Depth to bedrock	0.01
		Depth to hard bedrock	0.01	Cutbanks cave	0.10		
Rock outcrop--------	20	Not rated		Not rated		Not rated	
16:							
Lukanin sand--------	80	Somewhat limited		Very limited		Very limited	
		Moderately limiting slope	0.99	Cutbanks cave	1.00	Slope	1.00
				Moderately limiting slope	0.99	Droughty	1.00
17:							
Pits, quarry--------	100	Not rated		Not rated		Not rated	

Table 7.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
18:							
Polovina fine sandy loam	80	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Cutbanks cave	0.10		
				Depth to hard bedrock	0.08		
19:							
Polovina fine sandy loam	85	Very limited		Somewhat limited		Not limited	
		Frost action	1.00	Cutbanks cave	0.10		
				Depth to hard bedrock	0.08		
20:							
Polovina family, moderately deep	75	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Depth to hard bedrock	1.00	Depth to bedrock	0.10
		Depth to hard bedrock	0.10	Cutbanks cave	1.00		
21:							
Polovina family, very deep	90	Very limited		Somewhat limited		Somewhat limited	
		Frost action	1.00	Moderately limiting slope	0.63	Slope	0.63
		Moderately limiting slope	0.63	Cutbanks cave	0.10		
22:							
Polovina family, very deep	85	Very limited		Very limited		Very limited	
		Frost action	1.00	Very limiting slope	1.00	Slope	1.00
		Very limiting slope	1.00	Cutbanks cave	0.10		
23:							
Rock outcrop, basalt	100	Not rated		Not rated		Not rated	
24:							
Tsammana sand	75	Somewhat limited		Very limited		Somewhat limited	
		Content of large stones	0.52	Cutbanks cave	1.00	Droughty	0.97
				Content of large stones	0.52		
				Depth to hard bedrock	0.04		
25:							
Tsammana sand	45	Somewhat limited		Very limited		Somewhat limited	
		Content of large stones	0.77	Cutbanks cave	1.00	Droughty	0.97
				Content of large stones	0.77	Content of large stones	0.01
				Depth to hard bedrock	0.04		
Lithic Cryorthents	40	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Droughty	1.00
		Content of large stones	1.00	Content of large stones	1.00	Depth to bedrock	1.00
				Cutbanks cave	0.10		

Table 7.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
26:							
Typic Cryaquents, sandy	85	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Cutbanks cave	1.00	Depth to saturated zone	1.00
		Frost action	0.50	Depth to saturated zone	1.00	Droughty	0.96
27:							
Typic Cryaquents, mucky	45	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Frost action	0.50	Cutbanks cave	0.10		
Terric Cryohemists, loamy	40	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Subsidence	1.00	Content of organic matter	1.00	Depth to saturated zone	1.00
		Frost action	0.50	Cutbanks cave	0.10		
28:							
Typic Dystrocryepts, deep	50	Somewhat limited		Somewhat limited		Somewhat limited	
		Content of large stones	0.23	Depth to hard bedrock	0.84	Droughty	0.06
				Content of large stones	0.23		
				Cutbanks cave	0.10		
Typic Dystrocryepts, moderately deep	40	Somewhat limited		Very limited		Somewhat limited	
		Content of large stones	0.69	Depth to hard bedrock	1.00	Depth to bedrock	0.20
		Frost action	0.50	Content of large stones	0.69		
		Depth to hard bedrock	0.20	Cutbanks cave	0.10		
29:							
Typic Eutrocryepts	90	Somewhat limited		Somewhat limited		Somewhat limited	
		Moderately limiting slope	0.63	Depth to hard bedrock	0.82	Slope	0.63
		Frost action	0.50	Moderately limiting slope	0.63		
				Cutbanks cave	0.10		
30:							
Typic Haplocryands, deep	80	Very limited		Somewhat limited		Somewhat limited	
		Content of large stones	0.99	Content of large stones	0.99	Content of large stones	0.68
		Frost action	0.50	Depth to hard bedrock	0.86		
				Cutbanks cave	0.10		

Table 7.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
31:							
Typic Haplocryands, moderately deep	45	Very limited		Very limited		Very limited	
		Content of large stones	1.00	Depth to hard bedrock	1.00	Content of large stones	1.00
		Depth to hard bedrock	0.64	Content of large stones	1.00	Depth to bedrock	0.64
		Frost action	0.50	Cutbanks cave	0.10		
Lithic Haplocryands, rubbly	40	Very limited		Very limited		Very limited	
		Depth to hard bedrock	1.00	Depth to hard bedrock	1.00	Depth to bedrock	1.00
		Content of large stones	1.00	Content of large stones	1.00	Content of large stones	1.00
		Frost action	0.50	Cutbanks cave	0.10	Droughty	0.06
32:							
Typic Vitricryands	90	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Cutbanks cave	1.00	Slope	1.00
		Frost action	0.50	Very limiting slope	1.00	Droughty	0.11
33:							
Typic Vitricryands	85	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Very limiting slope	1.00	Slope	1.00
		Frost action	0.50	Cutbanks cave	1.00	Too clayey	1.00
						Droughty	0.94
34:							
Urban land	100	Not rated		Not rated		Not rated	
35:							
Zapadni fine sandy loam	90	Not limited		Very limited		Somewhat limited	
				Cutbanks cave	1.00	Droughty	0.01
36:							
Zolotoi silt loam	60	Very limited		Very limited		Somewhat limited	
		Frost action	1.00	Depth to hard bedrock	1.00	Content of large stones	0.32
		Depth to hard bedrock	0.01	Cutbanks cave	0.10	Depth to bedrock	0.01
Zolotoi silt loam, very stony	30	Very limited		Very limited		Very limited	
		Frost action	1.00	Depth to hard bedrock	1.00	Content of large stones	1.00
		Low strength	1.00	Content of large stones	0.16	Depth to bedrock	0.57
		Depth to hard bedrock	0.57	Cutbanks cave	0.10		
		Content of large stones	0.16				
37:							
Zolotoi family	60	Very limited		Very limited		Very limited	
		Frost action	1.00	Cutbanks cave	1.00	Content of large stones	1.00
		Low strength	1.00	Depth to hard bedrock	1.00	Depth to bedrock	0.05
		Depth to hard bedrock	0.05				

Table 7.--Building Site Development: Site Improvements--Continued

Map symbol and soil name	Pct. of map unit	Local roads and streets (Alaska criteria)		Shallow excavations (Alaska criteria)		Lawns and landscaping (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
37: Einahnuhto silty clay loam	40	Very limited Low strength Depth to hard bedrock Shrink-swell Frost action	 1.00 0.92 0.50 0.50	Very limited Depth to hard bedrock Cutbanks cave	 1.00 0.10	Somewhat limited Depth to bedrock	 0.92
38: Water	100	Not rated		Not rated		Not rated	

Table 8.--Sanitary Facilities: Sewage Treatment

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1:					
Aquic Dystrocryepts-	85	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00
				Depth to hard bedrock	0.08
2:					
Aquic Haplocryands--	55	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Content of large stones	0.88	Content of large stones	1.00
				Depth to hard bedrock	1.00
				Slope	0.66
Andic Haplocryods---	45	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Content of large stones	1.00	Content of large stones	1.00
				Slope	0.66
				Depth to hard bedrock	0.11
3:					
Beaches, rocky------	95	Not rated		Not rated	
4:					
Beaches, sandy------	95	Not rated		Not rated	
5:					
Beaches, tidal------	100	Not rated		Not rated	
6:					
Bogoslof silt loam--	85	Somewhat limited		Very limited	
		Filtering capacity	0.50	Seepage	1.00
7:					
Cryofluvents--------	45	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Flooding	0.40	Slope	0.66
Spodic Dystrocryepts	45	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
				Slope	0.66
8:					
Dumps, landfill-----	100	Not rated		Not rated	

Table 8.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
9:					
Einahnuhto silty clay loam	50	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
				Slope	0.66
Andic Haplocryods, rubbly	45	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Content of large stones	0.74	Depth to hard bedrock	1.00
				Content of large stones	1.00
				Slope	0.66
10:					
Histic Cryaquepts, sandy	70	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Filtering capacity	0.50	Seepage	1.00
				Depth to saturated zone	1.00
Terric Cryohemists, sandy	20	Very limited		Very limited	
		Restricted permeability	1.00	Ponding	1.00
		Ponding	1.00	Excess surface organic matter	1.00
		Depth to saturated zone	1.00	Seepage	1.00
				Depth to saturated zone	1.00
11:					
Histic Cryaquepts, tidal	50	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Filtering capacity	1.00	Seepage	1.00
				Depth to saturated zone	1.00
Typic Cryaquents, tidal	50	Very limited		Very limited	
		Flooding	1.00	Flooding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Filtering capacity	1.00	Depth to saturated zone	1.00
12:					
Humic Vitricryands	50	Somewhat limited		Very limited	
		Filtering capacity	0.50	Seepage	1.00
				Slope	0.31

Table 8.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
12:					
Vitrandic Dystrocryepts	40	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	0.50	Slope	1.00
13:					
Lithic Cryofolists	60	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Content of large stones	0.81	Excess surface organic matter	1.00
				Content of large stones	1.00
				Slope	0.66
Rock outcrop	40	Not rated		Not rated	
14:					
Lithic Haplocryands, gravelly, 10 to 30 percent slopes	50	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Slope	1.00	Slope	1.00
				Seepage	1.00
Lithic Haplocryands, gravelly, 1 to 8 percent slopes	35	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
				Seepage	1.00
				Slope	0.31
15:					
Lithic Haplocryands, rubbly	45	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Content of large stones	1.00	Content of large stones	1.00
				Seepage	1.00
				Slope	0.66
Typic Haplocryands, moderately deep	30	Very limited		Very limited	
		Depth to bedrock	1.00	Content of large stones	1.00
		Content of large stones	1.00	Depth to hard bedrock	1.00
				Slope	0.66
				Seepage	0.50
Rock outcrop	20	Not rated		Not rated	

Table 8.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
16:					
Lukanin sand	80	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
				Slope	1.00
17:					
Pits, quarry	100	Not rated		Not rated	
18:					
Polovina fine sandy loam	80	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
				Depth to hard bedrock	0.08
19:					
Polovina fine sandy loam	85	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
				Slope	0.66
				Depth to hard bedrock	0.08
20:					
Polovina family, moderately deep	75	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
				Seepage	1.00
				Slope	0.31
21:					
Polovina family, very deep	90	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Slope	0.63	Slope	1.00
22:					
Polovina family, very deep	85	Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00
		Slope	1.00	Seepage	1.00
23:					
Rock outcrop, basalt	100	Not rated		Not rated	
24:					
Tsammana sand	75	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Content of large stones	0.52	Slope	0.31
		Filtering capacity	0.50	Depth to hard bedrock	0.04
				Content of large stones	0.01

Table 8.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
25:					
Tsammana sand-------	45	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Content of large stones	0.77	Content of large stones	0.08
		Filtering capacity	0.50	Depth to hard bedrock	0.04
Lithic Cryorthents--	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Content of large stones	1.00	Content of large stones	1.00
				Seepage	1.00
26:					
Typic Cryaquents, sandy----------	85	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Seepage	1.00
		Filtering capacity	0.50	Depth to saturated zone	1.00
27:					
Typic Cryaquents, mucky----------	45	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Restricted permeability	0.31	Seepage	0.50
Terric Cryohemists, loamy----------	40	Very limited		Very limited	
		Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Excess surface organic matter	1.00
		Restricted permeability	0.31	Seepage	1.00
				Depth to saturated zone	1.00
28:					
Typic Dystrocryepts, deep----------	50	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Content of large stones	0.23	Depth to hard bedrock	0.84
				Slope	0.66
				Content of large stones	0.42
Typic Dystrocryepts, moderately deep----	40	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Content of large stones	0.69	Depth to hard bedrock	1.00
				Content of large stones	1.00
				Slope	0.66

Table 8.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
29:					
Typic Eutrocryepts--	90	Very limited		Very limited	
		Depth to bedrock	1.00	Slope	1.00
		Slope	0.63	Depth to hard bedrock	0.82
				Seepage	0.50
30:					
Typic Haplocryands, deep--	80	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Content of large stones	0.99	Content of large stones	1.00
				Depth to hard bedrock	0.86
31:					
Typic Haplocryands, moderately deep----	45	Very limited		Very limited	
		Depth to bedrock	1.00	Content of large stones	1.00
		Content of large stones	1.00	Seepage	1.00
				Depth to hard bedrock	1.00
				Slope	1.00
Lithic Haplocryands, rubbly----------	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
		Content of large stones	1.00	Seepage	1.00
				Content of large stones	1.00
				Slope	0.91
32:					
Typic Vitricryands--	90	Very limited		Very limited	
		Slope	1.00	Seepage	1.00
		Filtering capacity	1.00	Slope	1.00
				Content of large stones	0.88
33:					
Typic Vitricryands--	85	Very limited		Very limited	
		Slope	1.00	Slope	1.00
		Filtering capacity	1.00	Seepage	1.00
34:					
Urban land----------	100	Not rated		Not rated	
35:					
Zapadni fine sandy loam----------	90	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
				Slope	0.66

Table 8.--Sanitary Facilities: Sewage Treatment--Continued

Map symbol and soil name	Pct. of map unit	Septic tank absorption fields (Alaska criteria)		Sewage lagoons (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
36:					
Zolotoi silt loam	60	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
				Depth to hard bedrock	1.00
				Slope	0.66
Zolotoi silt loam, very stony	30	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
		Content of large stones	0.16	Depth to hard bedrock	1.00
				Content of large stones	1.00
				Slope	0.66
37:					
Zolotoi family	60	Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00
				Depth to hard bedrock	1.00
				Content of large stones	0.96
				Slope	0.66
Einahnuhto silty clay loam	40	Very limited		Very limited	
		Depth to bedrock	1.00	Depth to hard bedrock	1.00
				Slope	0.66
38:					
Water	100	Not rated		Not rated	

Table 9.--Sanitary Facilities: Landfills

(This table gives soil limitation ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
1:							
Aquic Dystrocryepts-	85	Very limited		Very limited		Somewhat limited	
		Depth to saturated zone	1.00	Seepage	1.00	Depth to saturated zone	0.69
		Depth to bedrock	1.00	Depth to saturated zone	1.00	Seepage	0.50
		Seepage	1.00	Depth to bedrock	0.09	Too sandy	0.50
		Too sandy, caving	0.50			Depth to bedrock	0.09
2:							
Aquic Haplocryands--	55	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	1.00
		Seepage	1.00	Depth to bedrock	1.00	Content of large stones	0.88
						Seepage	0.50
Andic Haplocryods---	45	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Content of large stones	1.00
		Seepage	1.00	Depth to bedrock	0.12	Seepage	0.50
						Depth to bedrock	0.12
3:							
Beaches, rocky------	95	Not rated		Not rated		Not rated	
4:							
Beaches, sandy------	95	Not rated		Not rated		Not rated	
5:							
Beaches, tidal------	100	Not rated		Not rated		Not rated	
6:							
Bogoslof silt loam--	85	Very limited		Very limited		Very limited	
		Too sandy, caving	1.00	Seepage	1.00	Too sandy	1.00
		Seepage	1.00			Seepage	1.00
7:							
Cryofluvents--------	45	Very limited		Very limited		Somewhat limited	
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage	1.00	Flooding	0.40		
		Flooding	0.40				
Spodic Dystrocryepts	45	Very limited		Very limited		Very limited	
		Too sandy, caving	1.00	Seepage	1.00	Too sandy	1.00
		Seepage	1.00			Seepage	0.50
8:							
Dumps, landfill-----	100	Not rated		Not rated		Not rated	

Table 9.--Sanitary Facilities: Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
9:							
Einahnuhto silty clay loam	50	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
Andic Haplocryods, rubbly	45	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
				Seepage	1.00	Content of large stones	0.75
						Seepage	0.50
10:							
Histic Cryaquepts, sandy	70	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Seepage	1.00	Seepage	1.00	Too sandy	1.00
		Too sandy, caving	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Depth to saturated zone	1.00			Depth to saturated zone	1.00
Terric Cryohemists, sandy	20	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Content of organic matter	1.00	Seepage	1.00	Content of organic matter	1.00
		Depth to saturated zone	1.00	Depth to saturated zone	1.00	Depth to saturated zone	0.99
11:							
Histic Cryaquepts, tidal	50	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Seepage	1.00	Seepage	1.00	Seepage	1.00
		Too sandy, caving	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00				
Typic Cryaquents, tidal	50	Very limited		Very limited		Very limited	
		Flooding	1.00	Flooding	1.00	Too sandy	1.00
		Seepage	1.00	Seepage	1.00	Seepage	1.00
		Too sandy, caving	1.00	Depth to saturated zone	1.00	Depth to saturated zone	1.00
		Depth to saturated zone	1.00				
12:							
Humic Vitricryands	50	Somewhat limited		Very limited		Very limited	
		Too sandy, caving	0.50	Seepage	1.00	Seepage	1.00
						Too sandy	0.50
Vitrandic Dystrocryepts	40	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Seepage	1.00
		Too sandy, caving	0.50	Moderately limiting slope	0.13	Too sandy	0.50
		Moderately limiting slope	0.13			Moderately limiting slope	0.13

Table 9.--Sanitary Facilities: Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
13:							
Lithic Cryofolists--	60	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Content of organic matter	1.00			Content of organic matter	1.00
		Cobble content	0.38			Content of large stones	0.81
Rock outcrop--------	40	Not rated		Not rated		Not rated	
14:							
Lithic Haplocryands, gravelly, 10 to 30 percent slopes-----	50	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Very limiting slope	1.00	Very limiting slope	1.00	Very limiting slope	1.00
		Seepage	1.00	Seepage	1.00	Seepage	0.50
Lithic Haplocryands, gravelly, 1 to 8 percent slopes-----	35	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage	1.00	Seepage	1.00	Seepage	0.50
15:							
Lithic Haplocryands, rubbly----------	45	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage	1.00			Content of large stones	1.00
		Cobble content	0.97			Hard to compact	1.00
						Seepage	0.50
Typic Haplocryands, moderately deep----	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Cobble content	1.00			Content of large stones	1.00
						Hard to compact	1.00
Rock outcrop--------	20	Not rated		Not rated		Not rated	
16:							
Lukanin sand--------	80	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too sandy	1.00
		Too sandy, caving	1.00	Moderately limiting slope	0.99	Seepage	1.00
		Moderately limiting slope	0.99			Moderately limiting slope	0.99
17:							
Pits, quarry--------	100	Not rated		Not rated		Not rated	
18:							
Polovina fine sandy loam----------	80	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Hard to compact	1.00
		Seepage	1.00	Depth to bedrock	0.09	Seepage	0.50
						Depth to bedrock	0.09

Table 9.--Sanitary Facilities: Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
19:							
Polovina fine sandy loam	85	Very limited		Very limited		Somewhat limited	
		Depth to bedrock	1.00	Seepage	1.00	Seepage	0.50
		Seepage	1.00	Depth to bedrock	0.09	Depth to bedrock	0.09
		Cobble content	0.03				
20:							
Polovina family, moderately deep	75	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	1.00
				Depth to bedrock	1.00	Seepage	0.50
21:							
Polovina family, very deep	90	Somewhat limited		Very limited		Somewhat limited	
		Moderately limiting slope	0.63	Seepage	1.00	Moderately limiting slope	0.63
		Cobble content	0.01	Moderately limiting slope	0.63	Seepage	0.50
22:							
Polovina family, very deep	85	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Very limiting slope	1.00	Very limiting slope	1.00
		Cobble content	0.01	Seepage	1.00	Seepage	0.50
23:							
Rock outcrop, basalt	100	Not rated		Not rated		Not rated	
24:							
Tsammana sand	75	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Too sandy	1.00
		Seepage	1.00	Depth to bedrock	0.04	Seepage	1.00
		Too sandy, caving	1.00			Content of large stones	0.84
						Depth to bedrock	0.04
25:							
Tsammana sand	45	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Too sandy	1.00
		Seepage	1.00	Depth to bedrock	0.04	Seepage	1.00
		Too sandy, caving	1.00			Content of large stones	0.97
						Depth to bedrock	0.04
Lithic Cryorthents	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage	1.00			Seepage	1.00
		Too sandy, caving	0.50			Content of large stones	1.00
						Too sandy	0.50

Table 9.--Sanitary Facilities: Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
26:							
Typic Cryaquents, sandy	85	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Seepage	1.00	Seepage	1.00	Too sandy	1.00
		Too sandy, caving	1.00	Depth to saturated zone	1.00	Seepage	1.00
		Depth to saturated zone	1.00			Depth to saturated zone	1.00
27:							
Typic Cryaquents, mucky	45	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
Terric Cryohemists, loamy	40	Very limited		Very limited		Very limited	
		Ponding	1.00	Ponding	1.00	Ponding	1.00
		Depth to saturated zone	1.00	Seepage	1.00	Depth to saturated zone	1.00
				Depth to saturated zone	1.00		
28:							
Typic Dystrocryepts, deep	50	Very limited		Very limited		Somewhat limited	
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	0.87
		Seepage	1.00	Depth to bedrock	0.87	Seepage	0.50
						Content of large stones	0.27
Typic Dystrocryepts, moderately deep	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage	1.00	Seepage	1.00	Content of large stones	0.69
						Seepage	0.50
29:							
Typic Eutrocryepts	90	Very limited		Somewhat limited		Somewhat limited	
		Depth to bedrock	1.00	Depth to bedrock	0.85	Depth to bedrock	0.85
		Moderately limiting slope	0.63	Moderately limiting slope	0.63	Gravel content	0.64
						Moderately limiting slope	0.63
30:							
Typic Haplocryands, deep	80	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Hard to compact	1.00
				Depth to bedrock	0.89	Content of large stones	0.97
						Depth to bedrock	0.89
31:							
Typic Haplocryands, moderately deep	45	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Cobble content	0.01			Content of large stones	1.00
						Hard to compact	1.00

Table 9.--Sanitary Facilities: Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
31:							
Lithic Haplocryands, rubbly	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
		Seepage	1.00			Content of large stones	1.00
		Cobble content	0.50			Hard to compact	1.00
						Seepage	0.50
32:							
Typic Vitricryands	90	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too sandy	1.00
		Too sandy, caving	1.00	Very limiting slope	1.00	Seepage	1.00
		Very limiting slope	1.00			Gravel content	1.00
						Very limiting slope	1.00
33:							
Typic Vitricryands	85	Very limited		Very limited		Very limited	
		Very limiting slope	1.00	Very limiting slope	1.00	Very limiting slope	1.00
		Seepage	1.00	Seepage	1.00	Too sandy	1.00
		Too sandy, caving	1.00			Seepage	1.00
						Gravel content	1.00
34:							
Urban land	100	Not rated		Not rated		Not rated	
35:							
Zapadni fine sandy loam	90	Very limited		Very limited		Very limited	
		Seepage	1.00	Seepage	1.00	Too sandy	1.00
		Too sandy, caving	1.00			Seepage	1.00
		Depth to bedrock	1.00				
36:							
Zolotoi silt loam	60	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	1.00
				Depth to bedrock	1.00	Hard to compact	1.00
Zolotoi silt loam, very stony	30	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00
				Seepage	1.00	Hard to compact	1.00
						Seepage	0.50
						Content of large stones	0.16
37:							
Zolotoi family	60	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Seepage	1.00	Depth to bedrock	1.00
		Cobble content	0.08	Depth to bedrock	1.00	Hard to compact	1.00
						Seepage	0.50
Einahnuhto silty clay loam	40	Very limited		Very limited		Very limited	
		Depth to bedrock	1.00	Depth to bedrock	1.00	Depth to bedrock	1.00

Table 9.--Sanitary Facilities: Landfills--Continued

Map symbol and soil name	Pct. of map unit	Trench sanitary landfill (Alaska criteria)		Area sanitary landfill (Alaska criteria)		Daily cover for landfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
38:							
Water	100	Not rated		Not rated		Not rated	

Table 10.--Construction Materials: Gravel and Sand

(This table gives soil suitability ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the potential limitation. Information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1:					
Aquic Dystrocryepts	85	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	 0.00 0.50	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	 0.00 0.50
2:					
Aquic Haplocryands	55	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00
Andic Haplocryods	45	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	 0.00 0.50	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	 0.00 0.50
3:					
Beaches, rocky	95	Not rated		Not rated	
4:					
Beaches, sandy	95	Not rated		Not rated	
5:					
Beaches, tidal	100	Not rated		Not rated	
6:					
Bogoslof silt loam	85	Improbable Bottom layer not a source	 0.00	Improbable Bottom layer not a source	 0.00
7:					
Cryofluvents	45	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	 0.00 0.50	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	 0.00 0.50
Spodic Dystrocryepts	45	Improbable Bottom layer not a source	 0.00	Improbable Bottom layer not a source	 0.00
8:					
Dumps, landfill	100	Not rated		Not rated	

Table 10.--Construction Materials: Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
9:					
Einahnuhto silty clay loam	50	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00
Andic Haplocryods, rubbly	45	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00
10:					
Histic Cryaquepts, sandy	70	Improbable Bottom layer not a source	 0.00	Sand source	
Terric Cryohemists, sandy	20	Improbable Organic soil Bottom layer not a source	 0.00 0.00	Improbable Organic soil	 0.00
11:					
Histic Cryaquepts, tidal	50	Improbable Bottom layer not a source	 0.00	Sand source	
Typic Cryaquents, tidal	50	Improbable Bottom layer not a source	 0.00	Sand source	
12:					
Humic Vitricryands	50	Improbable Bottom layer not a source	 0.00	Improbable Bottom layer not a source	 0.00
Vitrandic Dystrocryepts	40	Gravel source		Improbable Bottom layer not a source	 0.00
13:					
Lithic Cryofolists	60	Improbable Organic soil Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00 0.00	Improbable Organic soil Bottom layer not a source Hard bedrock within 4 feet	 0.00 0.00 0.00
Rock outcrop	40	Not rated		Not rated	

Table 10.--Construction Materials: Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
14:					
Lithic Haplocryands, gravelly, 10 to 30 percent slopes	50	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00	Improbable Bottom layer not a source Hard bedrock within 4 feet	 0.00 0.00
Lithic Haplocryands, gravelly, 1 to 8 percent slopes	35	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00	Improbable Bottom layer not a source Hard bedrock within 4 feet	 0.00 0.00
15:					
Lithic Haplocryands, rubbly	45	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00	Improbable Bottom layer not a source Hard bedrock within 4 feet	 0.00 0.00
Typic Haplocryands, moderately deep	30	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00	Improbable Hard bedrock within 4 feet Bottom layer not a source	 0.00 0.00
Rock outcrop	20	Not rated		Not rated	
16:					
Lukanin sand	80	Improbable Bottom layer not a source	 0.00	Sand source	
17:					
Pits, quarry	100	Not rated		Not rated	
18:					
Polovina fine sandy loam	80	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	 0.00 0.50	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	 0.00 0.50
19:					
Polovina fine sandy loam	85	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	 0.00 0.50	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	 0.00 0.50

Table 10.--Construction Materials: Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
20: Polovina family, moderately deep	75	Improbable Hard bedrock within 4 feet Bottom layer not a source	0.00 0.00	Improbable Bottom layer not a source Hard bedrock within 4 feet	0.00 0.00
21: Polovina family, very deep	90	Improbable Bottom layer not a source	0.00	Improbable Bottom layer not a source	0.00
22: Polovina family, very deep	85	Improbable Bottom layer not a source	0.00	Improbable Bottom layer not a source	0.00
23: Rock outcrop, basalt	100	Not rated		Not rated	
24: Tsammana sand	75	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	0.00 0.50	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	0.00 0.50
25: Tsammana sand	45	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	0.00 0.50	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	0.00 0.50
Lithic Cryorthents	40	Improbable Hard bedrock within 4 feet Bottom layer not a source	0.00 0.00	Improbable Bottom layer not a source Hard bedrock within 4 feet	0.00 0.00
26: Typic Cryaquents, sandy	85	Improbable Bottom layer not a source	0.00	Sand source	
27: Typic Cryaquents, mucky	45	Improbable Bottom layer not a source	0.00	Improbable Bottom layer not a source	0.00

Table 10.--Construction Materials: Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
27:					
Terric Cryohemists, loamy	40	Improbable		Improbable	
		Organic soil	0.00	Organic soil	0.00
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
28:					
Typic Dystrocryepts, deep	50	Improbable		Improbable	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
		Hard bedrock within 4 to 7 feet	0.50	Hard bedrock within 4 to 7 feet	0.50
Typic Dystrocryepts, moderately deep	40	Improbable		Improbable	
		Hard bedrock within 4 feet	0.00	Hard bedrock within 4 feet	0.00
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
29:					
Typic Eutrocryepts	90	Improbable		Improbable	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
		Hard bedrock within 4 to 7 feet	0.50	Hard bedrock within 4 to 7 feet	0.50
30:					
Typic Haplocryands, deep	80	Improbable		Improbable	
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
		Hard bedrock within 4 to 7 feet	0.50	Hard bedrock within 4 to 7 feet	0.50
31:					
Typic Haplocryands, moderately deep	45	Improbable		Improbable	
		Hard bedrock within 4 feet	0.00	Hard bedrock within 4 feet	0.00
		Bottom layer not a source	0.00	Bottom layer not a source	0.00
Lithic Haplocryands, rubbly	40	Improbable		Improbable	
		Hard bedrock within 4 feet	0.00	Bottom layer not a source	0.00
		Bottom layer not a source	0.00	Hard bedrock within 4 feet	0.00
32:					
Typic Vitricryands	90	Gravel source		Improbable	
				Bottom layer not a source	0.00

Table 10.--Construction Materials: Gravel and Sand--Continued

Map symbol and soil name	Pct. of map unit	Potential source of gravel (Alaska criteria)		Potential source of sand (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
33:					
Typic Vitricryands	85	Gravel source		Improbable Bottom layer not a source	0.00
34:					
Urban land	100	Not rated		Not rated	
35:					
Zapadni fine sandy loam	90	Improbable Bottom layer not a source Hard bedrock within 4 to 7 feet	0.00 0.50	Probable Hard bedrock within 4 to 7 feet	0.50
36:					
Zolotoi silt loam	60	Improbable Hard bedrock within 4 feet Bottom layer not a source	0.00 0.00	Improbable Hard bedrock within 4 feet Bottom layer not a source	0.00 0.00
Zolotoi silt loam, very stony	30	Improbable Hard bedrock within 4 feet Bottom layer not a source	0.00 0.00	Improbable Hard bedrock within 4 feet Bottom layer not a source	0.00 0.00
37:					
Zolotoi family	60	Improbable Hard bedrock within 4 feet Bottom layer not a source	0.00 0.00	Improbable Hard bedrock within 4 feet Bottom layer not a source	0.00 0.00
Einahnuhto silty clay loam	40	Improbable Hard bedrock within 4 feet Bottom layer not a source	0.00 0.00	Improbable Hard bedrock within 4 feet Bottom layer not a source	0.00 0.00
38:					
Water	100	Not rated		Not rated	

Table 11.--Construction Materials: Topsoil and Roadfill

(This table gives soil suitability ratings and the primary limiting factors associated with the ratings. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the potential limitation. Information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation. See text for further explanation of ratings in this table.)

Map symbol and soil name	Pct. of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
1:					
Aquic Dystrocryepts-	85	Poor		Fair	
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
		Depth to saturated zone	0.78	Depth to saturated zone	0.78
				Depth to bedrock	0.92
2:					
Aquic Haplocryands--	55	Fair		Poor	
		Depth to bedrock	0.43	Depth to bedrock	0.00
		Rock fragment content	0.50	Stone content	0.00
				High frost action (check lower layers)	0.00
Andic Haplocryods---	45	Good		Poor	
				Stone content	0.00
				High frost action (check lower layers)	0.00
				Depth to bedrock	0.89
3:					
Beaches, rocky------	95	Not rated		Not rated	
4:					
Beaches, sandy------	95	Not rated		Not rated	
5:					
Beaches, tidal------	100	Not rated		Not rated	
6:					
Bogoslof silt loam--	85	Poor		Fair	
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
7:					
Cryofluvents--------	45	Good		Fair	
				Moderate frost action (check lower layers)	0.50
Spodic Dystrocryepts	45	Good		Fair	
				Moderate frost action (check lower layers)	0.50

Table 11.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Pct. of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
8:					
Dumps, landfill	100	Not rated		Not rated	
9:					
Einahnuhto silty clay loam	50	Fair		Poor	
		Rock fragment content	0.88	Depth to bedrock	0.00
		No bedrock depth limitation	0.99	Moderate frost action (check lower layers)	0.50
				Shrink-swell	0.87
Andic Haplocryods, rubbly	45	Fair		Poor	
		Depth to bedrock	0.65	Depth to bedrock	0.00
				Stone content	0.00
				High frost action (check lower layers)	0.00
10:					
Histic Cryaquepts, sandy	70	Poor		Poor	
		Too sandy	0.00	Depth to saturated zone	0.00
		Depth to saturated zone	0.00	Moderate frost action (check lower layers)	0.50
Terric Cryohemists, sandy	20	Poor		Fair	
		Content of organic matter	0.00	Depth to saturated zone	0.22
		Depth to saturated zone	0.22		
11:					
Histic Cryaquepts, tidal	50	Poor		Fair	
		Too sandy	0.00	Depth to saturated zone	0.12
		Depth to saturated zone	0.12	Moderate frost action (check lower layers)	0.50
Typic Cryaquents, tidal	50	Poor		Poor	
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
12:					
Humic Vitricryands	50	Poor		Poor	
		Too sandy	0.00	High frost action (check lower layers)	0.00
		Rock fragment content	0.88		

Table 11.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Pct. of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
12:					
Vitrandic Dystrocryepts	40	Poor		Fair	
		Slope	0.00	Stone content	0.39
		Rock fragment content	0.50	Moderate frost action (check lower layers)	0.50
13:					
Lithic Cryofolists	60	Poor		Poor	
		Rock fragment content	0.00	Stone content	0.00
		Depth to bedrock	0.00	Depth to bedrock	0.00
		Content of organic matter	0.00	High frost action (check lower layers)	0.00
				Cobble content	0.62
Rock outcrop	40	Not rated		Not rated	
14:					
Lithic Haplocryands, gravelly, 10 to 30 percent slopes	50	Poor		Poor	
		Slope	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.00	High frost action (check lower layers)	0.00
		Rock fragment content	0.12	Slope	0.68
Lithic Haplocryands, gravelly, 1 to 8 percent slopes	35	Poor		Poor	
		Depth to bedrock	0.00	Depth to bedrock	0.00
		Rock fragment content	0.12	High frost action (check lower layers)	0.00
15:					
Lithic Haplocryands, rubbly	45	Poor		Poor	
		Depth to bedrock	0.00	Depth to bedrock	0.00
		Rock fragment content	0.00	Stone content	0.00
				Cobble content	0.03
				Moderate frost action (check lower layers)	0.50
Typic Haplocryands, moderately deep	30	Poor		Poor	
		Rock fragment content	0.00	Cobble content	0.00
		No bedrock depth limitation	0.99	Depth to bedrock	0.00
				Stone content	0.00
				Moderate frost action (check lower layers)	0.50
Rock outcrop	20	Not rated		Not rated	

Table 11.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Pct. of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
16:					
Lukanin sand	80	Poor		Poor	
		Slope	0.00	Slope	0.00
		Too sandy	0.00		
17:					
Pits, quarry	100	Not rated		Not rated	
18:					
Polovina fine sandy loam	80	Good		Poor	
				High frost action (check lower layers)	0.00
				Depth to bedrock	0.92
19:					
Polovina fine sandy loam	85	Good		Poor	
				High frost action (check lower layers)	0.00
				Depth to bedrock	0.92
20:					
Polovina family, moderately deep	75	Fair		Poor	
		Depth to bedrock	0.90	Depth to bedrock	0.00
				High frost action (check lower layers)	0.00
21:					
Polovina family, very deep	90	Fair		Poor	
		Slope	0.37	High frost action (check lower layers)	0.00
22:					
Polovina family, very deep	85	Poor		Poor	
		Slope	0.00	High frost action (check lower layers)	0.00
				Slope	0.82
23:					
Rock outcrop, basalt	100	Not rated		Not rated	
24:					
Tsammana sand	75	Fair		Poor	
		Rock fragment content	0.88	Stone content	0.00
				Depth to bedrock	0.96

Table 11.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Pct. of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
25:					
Tsammana sand-------	45	Fair		Poor	
		Rock fragment content	0.88	Stone content	0.00
				Depth to bedrock	0.96
Lithic Cryorthents--	40	Poor		Poor	
		Depth to bedrock	0.00	Depth to bedrock	0.00
				Stone content	0.00
26:					
Typic Cryaquents, sandy----------	85	Poor		Poor	
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Too sandy	0.00	Moderate frost action (check lower layers)	0.50
27:					
Typic Cryaquents, mucky----------	45	Good		Fair	
				Moderate frost action (check lower layers)	0.50
Terric Cryohemists, loamy----------	40	Poor		Poor	
		Depth to saturated zone	0.00	Depth to saturated zone	0.00
		Content of organic matter	0.00	Moderate frost action (check lower layers)	0.50
28:					
Typic Dystrocryepts, deep----------	50	Good		Poor	
				Stone content	0.00
				Depth to bedrock	0.16
Typic Dystrocryepts, moderately deep----	40	Fair		Poor	
		Depth to bedrock	0.80	Depth to bedrock	0.00
		Rock fragment content	0.88	Stone content	0.00
				Moderate frost action (check lower layers)	0.50
29:					
Typic Eutrocryepts--	90	Poor		Fair	
		Rock fragment content	0.00	Depth to bedrock	0.18
		Slope	0.37	Moderate frost action (check lower layers)	0.50

Table 11.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Pct. of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
30:					
Typic Haplocryands, deep	80	Fair		Poor	
		Rock fragment content	0.88	Stone content	0.00
				Depth to bedrock	0.14
				Moderate frost action (check lower layers)	0.50
31:					
Typic Haplocryands, moderately deep	45	Poor		Poor	
		Rock fragment content	0.00	Depth to bedrock	0.00
		Depth to bedrock	0.36	Stone content	0.00
				Moderate frost action (check lower layers)	0.50
				Cobble content	0.99
Lithic Haplocryands, rubbly	40	Poor		Poor	
		Rock fragment content	0.00	Stone content	0.00
		Depth to bedrock	0.00	Depth to bedrock	0.00
				Moderate frost action (check lower layers)	0.50
				Cobble content	0.50
32:					
Typic Vitricryands	90	Poor		Poor	
		Slope	0.00	Slope	0.00
				Moderate frost action (check lower layers)	0.50
				Cobble content	0.98
33:					
Typic Vitricryands	85	Poor		Poor	
		Slope	0.00	Slope	0.00
		Rock fragment content	0.00	Moderate frost action (check lower layers)	0.50
34:					
Urban land	100	Not rated		Not rated	
35:					
Zapadni fine sandy loam	90	Good		Good	
36:					
Zolotoi silt loam	60	Fair		Poor	
		Rock fragment content	0.88	Depth to bedrock	0.00
		No bedrock depth limitation	0.99	High frost action (check lower layers)	0.00
				Stone content	0.78

Table 11.--Construction Materials: Topsoil and Roadfill--Continued

Map symbol and soil name	Pct. of map unit	Potential source of topsoil (Alaska criteria)		Potential source of roadfill (Alaska criteria)	
		Rating class and limiting features	Value	Rating class and limiting features	Value
36:					
Zolotoi silt loam, very stony	30	Fair		Poor	
		Depth to bedrock	0.43	Depth to bedrock	0.00
				Stone content	0.00
				High frost action (check lower layers)	0.00
37:					
Zolotoi family	60	Fair		Poor	
		Rock fragment content	0.12	Depth to bedrock	0.00
		Depth to bedrock	0.95	High frost action (check lower layers)	0.00
				Cobble content	0.92
				Stone content	0.99
Einahnuhto silty clay loam	40	Fair		Poor	
		Depth to bedrock	0.08	Depth to bedrock	0.00
				Moderate frost action (check lower layers)	0.50
				Shrink-swell	0.87
38:					
Water	100	Not rated		Not rated	

Table 12.--Ecological Sites

Map symbol and soil name	Ecological site name	Ecological site ID
1:		
Aquic Dystrocryepts	Forb/Sedge Tundra	179Xb059AK
2:		
Aquic Haplocryands	Grassy Meadow	179Xb099AK
Andic Haplocryods	Grassy Meadow	179Xb099AK
3:		
Beaches, rocky	Rocky Beach	179Xb081AK
4:		
Beaches, sandy	Sandy Beach	179Xb080AK
5:		
Beaches, tidal	Mud Flats	179Xb083AK
6:		
Bogoslof silt loam	Crowberry (Lowland)	179Xb030AK
7:		
Cryofluvents	Grassy Drainage	179Xb051AK
Spodic Dystrocryepts	Grassy Drainage	179Xb051AK
9:		
Einahnuhto silty clay loam	Forb Tundra	179Xb057AK
Andic Haplocryods, rubbly	Forb Tundra	179Xb057AK
10:		
Histic Cryaquepts, sandy	Lake Margin	179Xb061AK
Terric Cryohemists, sandy	Lake Margin	179Xb061AK
11:		
Histic Cryaquepts, tidal	Wet Meadow Complex	179Xb053AK
Typic Cryaquents, tidal	Wet Meadow Complex	179Xb053AK
12:		
Humic Vitricryands	Beach Dunes and Ridges (Old)	179Xb054AK
Vitrandic Dystrocryepts	Beach Dunes and Ridges (Old)	179Xb054AK
13:		
Lithic Cryofolists	Rubble Lava Flow	179Xb086AK
Rock outcrop	Rubble Lava Flow	179Xb086AK
14:		
Lithic Haplocryands, gravelly, 10 to 30 percent slopes	Crowberry (Upland)	179Xb032AK
Lithic Haplocryands, gravelly, 1 to 8 percent slopes	Crowberry (Upland)	179Xb032AK
15:		
Lithic Haplocryands, rubbly	Rocky Uplands	179Xb085AK
Typic Haplocryands, moderately deep	Rocky Uplands	179Xb085AK
Rock outcrop	Rocky Uplands	179Xb085AK

Table 12.--Ecological Sites--Continued

Map symbol and soil name	Ecological site name	Ecological site ID
16: Lukanin sand	Beach Dunes and Ridges	179Xb050AK
17: Pits, quarry.		
18: Polovina fine sandy loam	Forb Tundra	179Xb057AK
19: Polovina fine sandy loam	Forb Tundra	179Xb057AK
20: Polovina family, moderately deep	Dwarf Shrub Tundra	179Xb033AK
21: Polovina family, very deep	Herbaceous Hillsides	179Xb056AK
22: Polovina family, very deep	Herbaceous Hillsides	179Xb056AK
23: Rock outcrop, basalt	Sea Cliff	179Xb082AK
24: Tsammana sand	Forb Tundra (Coastal)	179Xb055AK
25: Tsammana sand	Forb Tundra (Coastal)	179Xb055AK
Lithic Cryorthents	Forb Tundra (Coastal)	179Xb055AK
26: Typic Cryaquents, sandy	Wet Lake Bed (Juncus)	179Xb052AK
27: Typic Cryaquents, mucky	Sedge Meadow (Wet)	179Xb062AK
Terric Cryohemists, loamy	Sedge Meadow (Wet)	179Xb062AK
28: Typic Dystrocryepts, deep	Forb/Sedge Tundra	179Xb059AK
Typic Dystrocryepts, moderately deep	Forb/Sedge Tundra	179Xb059AK
29: Typic Eutrocryepts	Moss/Willow (Coastal)	179Xb031AK
30: Typic Haplocryands, deep	Forb Tundra	179Xb057AK
31: Typic Haplocryands, moderately deep	Rocky Shrub Tundra	179Xb058AK
Lithic Haplocryands, rubbly	Rocky Shrub Tundra	179Xb058AK
32: Typic Vitricryands	Rocky Volcanic Cone	179Xb088AK
33: Typic Vitricryands	Crowberry (Upland)	179Xb032AK
35: Zapadni fine sandy loam	Forb/Sedge Tundra	179Xb059AK

Table 12.--Ecological Sites--Continued

Map symbol and soil name	Ecological site name	Ecological site ID
36:		
Zolotoi silt loam	Crowberry (Lowland)	179Xb030AK
Zolotoi silt loam, very stony	Crowberry (Lowland)	179Xb030AK
37:		
Zolotoi family	Sedge Meadow	179Xb060AK
Einahnuhto silty clay loam	Sedge Meadow	179Xb060AK
38:		
Water	Lake	179Xb003AK
	Ephemeral Lake	179Xb002AK
	Lagoon	179Xb004AK

Table 13.--Hydric Soils List

Map symbol and map unit name	Component (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
1:							
Aquic Dystrocryepts, 0 to 3 percent slopes	Aquic Dystrocryepts (85%)	No	Depressions, plains	---	---	---	---
	Soils that are very poorly drained (15%)	Yes	Depressions, plains	2B2	Yes	No	No
2:							
Aquic Haplocryands-Andic Haplocryods complex, 1 to 8 percent slopes	Aquic Haplocryands (55%)	No	Dipslopes, drainageways	---	---	---	---
	Andic Haplocryods (45%)	No	Drainageways	---	---	---	---
	Bouldery areas (10%)	No	Dipslopes	---	---	---	---
3:							
Beaches, rocky	Beaches, rocky (95%)	No	Beaches	---	---	---	---
	Beaches, sandy (5%)	No	Beaches	---	---	---	---
4:							
Beaches, sandy	Beaches, sandy (95%)	No	Beaches	---	---	---	---
	Beaches, rocky (5%)	No	Beaches	---	---	---	---
5:							
Beaches, tidal	Beaches, tidal (100%)	No	Tidal flats	---	---	---	---
6:							
Bogoslof silt loam, 0 to 3 percent slopes	Bogoslof silt loam (85%)	No	Plains, terraces	---	---	---	---
	Soils that have a loamy substratum (15%)	No	Terraces	---	---	---	---

Table 13.--Hydric Soils List--Continued

Map symbol and map unit name	Component (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
7:							
Cryofluvents-Spodic Dystrocryepts complex, 1 to 8 percent slopes	Cryofluvents (45%)	No	Drainageways	---	---	---	---
	Spodic Dystrocryepts (45%)	No	Drainageways, terraces	---	---	---	---
	Soils in drainageways that are somewhat poorly drained (5%)	No	Drainageways	---	---	---	---
	Soils that are shallow to bedrock (5%)	No	---	---	---	---	---
8:							
Dumps, landfill	Dumps, landfill (100%)	No	Plains	---	---	---	---
9:							
Einahnuhto silty clay loam-Andic Haplocryods, rubbly, complex, 1 to 8 percent slopes	Einahnuhto silty clay loam (50%)	No	Dipslopes	---	---	---	---
	Andic Haplocryods, rubbly (45%)	No	Dipslopes	---	---	---	---
	Terric Cryohemists (2%)	Yes	Dipslopes, fens	1	Yes	No	No
	Rock outcrop (3%)	No	---	---	---	---	---
10:							
Histic Cryaquepts-Terric Cryohemists complex, 0 to 3 percent slopes	Histic Cryaquepts, sandy (70%)	Yes	Lake plains, lakeshores	2B2,3	Yes	No	Yes
	Terric Cryohemists, sandy (20%)	Yes	Lake plains, lakeshores	1	Yes	No	No
	Mineral soils with less than 8 inches of organic material (5%)	Yes	Lakeshores	2B2,3	Yes	No	Yes
	Water (5%)	Yes	Lake plains	---	---	---	---
11:							
Histic Cryaquepts-Typic Cryaquents complex, tidal, 0 to 3 percent slopes	Histic Cryaquepts, tidal (50%)	Yes	Tidal flats	2B2	Yes	No	No
	Typic Cryaquents, tidal (50%)	Yes	Tidal flats	2B2	Yes	No	No

Table 13.--Hydric Soils List--Continued

Map symbol and map unit name	Component (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
12:							
Humic Vitricryands-Vitrandic Dystrocryepts complex, rolling	Humic Vitricryands (50%)	No	Strand plains	---	---	---	---
	Vitrandic Dystrocryepts (40%)	No	Dunes, strand plains	---	---	---	---
	Humic Vitricryands, sandy substratum (10%)	No	Strand plains	---	---	---	---
13:							
Lithic Cryofolists-Rock outcrop complex, 4 to 16 percent slopes	Lithic Cryofolists (60%)	No	Lava flows	---	---	---	---
	Rock outcrop (40%)	No	Lava flows	---	---	---	---
14:							
Lithic Haplocryands, gravelly, complex, 1 to 30 percent slopes	Lithic Haplocryands, gravelly, 10 to 30 percent slopes (50%)	No	Hills	---	---	---	---
	Lithic Haplocryands, gravelly, 1 to 8 percent slopes (35%)	No	Hills	---	---	---	---
	Rock outcrop (10%)	No	---	---	---	---	---
	Polovina (5%)	No	Plains	---	---	---	---
15:							
Lithic Haplocryands, rubbly-Typic Haplocryands, moderately deep-Rock outcrop complex, 1 to 8 percent slopes	Lithic Haplocryands, rubbly (45%)	No	Lava flows	---	---	---	---
	Typic Haplocryands, moderately deep (30%)	No	Lava flows	---	---	---	---
	Rock outcrop (20%)	No	Lava flows	---	---	---	---
	Soils on slopes of 10 to 30 percent (5%)	No	Lava flows	---	---	---	---

Table 13.--Hydric Soils List--Continued

Map symbol and map unit name	Component (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
16:							
Lukanin sand, 1 to 60 percent slopes	Lukanin sand (80%)	No	Dunes	---	---	---	---
	Typic Cryaquents, sandy (15%)	Yes	Depressions, dunes	2B2	Yes	No	No
	Histic Cryaquepts, sandy (5%)	Yes	Depressions, dunes	2B2	Yes	No	No
17:							
Pits, quarry	Pits, quarry (100%)	No	Hills, lava flows	---	---	---	---
18:							
Polovina fine sandy loam, 0 to 3 percent slopes	Polovina fine sandy loam (80%)	No	Plains	---	---	---	---
	Polovina family, moderately deep (10%)	No	Plains	---	---	---	---
	Soils that have a cemented pan (10%)	No	Plains	---	---	---	---
19:							
Polovina fine sandy loam, 1 to 8 percent slopes	Polovina fine sandy loam (85%)	No	Dipslopes	---	---	---	---
	Soils that have a sandy substratum (15%)	No	Dipslopes	---	---	---	---
20:							
Polovina family, moderately deep, 1 to 8 percent slopes	Polovina family, moderately deep (75%)	No	Hills	---	---	---	---
	Soils that have a sandy substratum (10%)	No	Drainageways, hills	---	---	---	---
	Soils that are shallow to bedrock (10%)	No	Hills	---	---	---	---
	Rock outcrop (5%)	No	Hills	---	---	---	---
21:							
Polovina family, very deep, 4 to 16 percent slopes	Polovina family, very deep (90%)	No	Hills	---	---	---	---
	Soils that have a sandy substratum (10%)	No	Hills	---	---	---	---

Table 13.--Hydric Soils List--Continued

Map symbol and map unit name	Component (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
22:							
Polovina family, very deep, 10 to 30 percent slopes	Polovina family, very deep (85%)	No	Hills	---	---	---	---
	Soils that have a sandy substratum (15%)	No	Hills	---	---	---	---
23:							
Rock outcrop, basalt	Rock outcrop, basalt (100%)	No	Sea cliffs	---	---	---	---
24:							
Tsammana sand, 1 to 8 percent slopes	Tsammana sand (75%)	No	Dipslopes	---	---	---	---
	Soils that are moderately deep (10%)	No	Dipslopes	---	---	---	---
	Soils that have a sandy substratum (10%)	No	Dipslopes	---	---	---	---
	Rock outcrop (5%)	No	---	---	---	---	---
25:							
Tsammana sand-Lithic Cryorthents complex, 0 to 3 percent slopes	Tsammana sand (45%)	No	Beach terraces	---	---	---	---
	Lithic Cryorthents (40%)	No	Beach terraces	---	---	---	---
	Soils that are moderately deep to bedrock (10%)	No	Beach terraces	---	---	---	---
	Soils that have a cemented pan (5%)	No	Beach terraces	---	---	---	---
26:							
Typic Cryaquents, sandy, 0 to 3 percent slopes	Typic Cryaquents, sandy (85%)	Yes	Lake plains	2B1,3	Yes	No	Yes
	Histic Cryaquepts, sandy (15%)	Yes	Lake plains	2B2,3	Yes	No	Yes

Table 13.--Hydric Soils List--Continued

Map symbol and map unit name	Component (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
27:							
Typic Cryaquents, mucky-Terric Cryohemists complex, 0 to 3 percent slopes	Typic Cryaquents, mucky (45%)	Yes	Lake plains	2B3	Yes	No	No
	Terric Cryohemists, loamy (40%)	Yes	Lake plains	1	Yes	No	No
	Water (15%)	No	---	---	---	---	---
28:							
Typic Dystrocryepts complex, undulating	Typic Dystrocryepts, deep (50%)	No	Plains	---	---	---	---
	Typic Dystrocryepts, moderately deep (40%)	No	Plains	---	---	---	---
	Soils that are somewhat poorly drained (10%)	No	Plains	---	---	---	---
29:							
Typic Eutrocryepts, 4 to 16 percent slopes	Typic Eutrocryepts (90%)	No	Hills	---	---	---	---
	Soils that are moderately deep to bedrock (10%)	No	Hills	---	---	---	---
30:							
Typic Haplocryands, deep, 1 to 8 percent slopes	Typic Haplocryands, deep (80%)	No	Depressions, lava flows	---	---	---	---
	Soils that are moderately deep (15%)	No	Lava flows	---	---	---	---
	Bouldery areas (5%)	No	Lava flows	---	---	---	---

Table 13.--Hydric Soils List--Continued

Map symbol and map unit name	Component (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
31:							
Typic Haplocryands, moderately deep-Lithic Haplocryands, rubbly, complex, 1 to 8 percent slopes	Typic Haplocryands, moderately deep (45%)	No	Lava flows	---	---	---	---
	Lithic Haplocryands, rubbly (40%)	No	Lava flows	---	---	---	---
	Soils that are somewhat poorly drained (10%)	No	Depressions, lava flows	---	---	---	---
	Rock outcrop (5%)	No	---	---	---	---	---
32:							
Typic Vitricryands, 4 to 75 percent slopes	Typic Vitricryands (90%)	No	Volcanic cones	---	---	---	---
	Cinder land (10%)	No	Volcanic cones	---	---	---	---
33:							
Typic Vitricryands, 45 to 70 percent slopes	Typic Vitricryands (85%)	No	Volcanic cones	---	---	---	---
	Rock outcrop (15%)	No	Volcanic cones	---	---	---	---
34:							
Urban land	Urban land (100%)	No	Hills, plains	---	---	---	---
35:							
Zapadni fine sandy loam, 1 to 8 percent slopes	Zapadni fine sandy loam (90%)	No	Escarpments, strand plains	---	---	---	---
	Soils on slopes of more than 25 percent (5%)	No	Escarpments, strand plains	---	---	---	---
	Soils that have a cemented pan (5%)	No	Escarpments, strand plains	---	---	---	---
36:							
Zolotoi complex, 1 to 8 percent slopes	Zolotoi silt loam (60%)	No	Dipslopes, hummocks	---	---	---	---
	Zolotoi silt loam, very stony (30%)	No	Dipslopes	---	---	---	---
	Soils that are shallow to bedrock (10%)	No	Dipslopes	---	---	---	---
	Soils that are somewhat poorly drained (10%)	No	Dipslopes	---	---	---	---

Table 13.--Hydric Soils List--Continued

Map symbol and map unit name	Component (% of map unit)	Hydric	Local landform	Hydric soils criteria			
				Hydric criteria code	Meets saturation criteria	Meets flooding criteria	Meets ponding criteria
37:							
Zolotoi family-Einahnuhto complex, 1 to 8 percent slopes	Zolotoi family (60%)	No	Dipslopes	---	---	---	---
	Einahnuhto silty clay loam (40%)	No	Dipslopes	---	---	---	---
38:							
Water	Water (100%)	No	Lagoons, lakes	---	---	---	---

Table 14.--Engineering Index Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
1:												
Aquic Dystrocryepts--	0-2	Mucky peat-----	PT	A-8	0	0	---	---	---	---	---	---
	2-4	Fine sandy loam	SM, ML	A-2, A-4	0	0-5	100	100	70-100	30-60	10-15	NP-5
	4-24	Sand, fine sandy loam.	SP-SM	A-1, A-2, A-3	0	0-5	100	100	70-90	5-35	0-15	NP-5
	24-28	Fine sandy loam	SM, ML	A-2	0	0-5	100	100	75-100	35-55	10-15	NP-5
	28-55	Stratified loamy sand to sandy loam.	SP-SM, SM, ML	A-1	0	0-5	100	70-100	45-70	10-55	0-15	NP-5
	55+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
2:												
Aquic Haplocryands---	0-3	Stony mucky peat.	PT	A-8	10-70	0-10	---	---	---	---	---	---
	3-8	Stony medial silt loam.	ML, MH	A-4, A-5	30-70	0-10	100	85-100	65-100	60-80	25-35	NP-10
	8-16	Medial cobbly fine sandy loam.	ML, MH	A-5, A-4	30-70	15-25	100	75-100	65-100	35-55	25-35	NP-10
	16-24	Cobbly silt loam.	ML	A-4	10-50	15-25	100	75-100	65-100	60-80	25-35	NP-10
	24-29	Gravelly silt loam.	ML	A-4	15-50	0-15	100	75-100	65-100	55-75	25-35	NP-10
	29+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
Andic Haplocryods----	0-4	Peat-----------	PT	A-8	20-40	0-10	---	---	---	---	---	---
	4-8	Medial silt loam.	ML, MH	A-4, A-5	10-60	0-15	95-100	95-100	90-100	75-90	40-60	NP-5
	8-13	Medial very fine sandy loam, silt loam.	ML, MH	A-4, A-5	10-40	0-15	95-100	95-100	80-90	70-80	40-60	NP-5
	13-35	Very stony silt loam.	ML	A-4	35-60	0-15	95-100	95-100	70-90	60-70	25-35	NP-10
	35-54	Very stony silt loam.	ML	A-4	35-40	0-15	95-100	95-100	70-90	60-70	25-35	NP-10
	54+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
3, 4, 5: Beaches.												

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
6:												
Bogoslof silt loam---	0-2	Peat----------	PT	A-8	0	0	100	---	---	---	---	---
	2-4	Medial silt loam.	ML, MH	A-4, A-5	0	0	100	100	90-100	75-100	40-60	NP-5
	4-13	Medial fine sandy loam.	ML, SM	A-4, A-5	0	0	100	100	75-100	35-55	35-50	NP-5
	13-51	Sand----------	SW	A-1	0	0	100	100	40-85	20-25	0-0	NP
	51-75	Sand----------	SW	A-1	0	0	100	75-100	35-60	15-25	0-0	NP
	75-79	Stratified sand to silt loam.	SM	A-2, A-4	0	0	100	90-100	80-90	15-25	0-0	NP
7:												
Cryofluvents---------	0-3	Mucky peat-----	PT	A-8	0-10	0-5	---	---	---	---	---	---
	3-35	Stratified fine sandy loam to silt loam.	ML, SM	A-4	0-10	0-5	95-100	90-100	60-80	35-55	10-25	NP-5
	35-61	Stratified loamy fine sand to fine sandy loam.	ML, SM, SP-SM	A-3, A-1, A-2	0-10	0-5	95-100	70-100	45-70	10-55	0-15	NP-5
	61+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
Spodic Dystrocryepts-	0-3	Mucky peat, silt loam.	PT	A-8	0-10	0-10	---	---	---	---	---	---
	3-6	Silt loam------	ML	A-4	0-10	0-10	100	85-100	85-90	60-85	25-35	NP-10
	6-13	Silt loam------	ML	A-4	0-10	0-10	100	85-100	85-90	60-85	25-35	NP-10
	13-15	Medial silt loam.	MH, ML	A-5	0-10	0-10	100	85-100	85-90	60-85	40-60	NP-5
	15-20	Fine sand------	SP-SM	A-3	0	0-10	100	85-100	70-85	5-25	0-0	NP
	20-79	Stratified fine sand to loamy very fine sand to silt loam.	SM	A-2, A-4	0	0-10	100	85-100	65-85	30-50	0-15	NP-5
	79+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
8:												
Dumps, landfill.												

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
9:												
Einahnuhto silty clay loam	0-3	Mucky peat	PT	A-8	0	---	---	---	---	---	---	---
	3-6	Silty clay loam	CL	A-7, A-6	0	0	100	90-100	80-100	80-90	30-50	15-30
	6-10	Silty clay loam	CL	A-7, A-6	0	5-10	90-100	90-100	80-95	70-90	30-50	15-30
	10-20	Cobbly silty clay loam.	CL	A-7, A-6	0	5-25	80-100	80-100	75-90	70-85	30-50	15-35
	20-41	Cobbly silt loam.	ML	A-4	0-70	5-10	85-100	75-100	75-85	70-75	25-35	5-15
	41+	Bedrock	---	---	---	---	---	---	---	---	---	---
Andic Haplocryods, rubbly	0-4	Stony mucky peat.	PT	A-8	20-40	0	---	---	---	---	---	---
	4-6	Very stony medial very fine sandy loam.	ML	A-4	20-60	0-5	95-100	95-100	80-90	70-80	25-35	NP-10
	6-15	Medial very stony fine sandy loam.	ML, SM	A-5, A-4	25-40	0-5	95-100	95-100	70-100	40-70	35-50	NP-5
	15-31	Very stony fine sandy loam.	ML, SM	A-4	20-50	0-5	95-100	90-100	70-100	40-70	0-15	NP-5
	31-35	Gravelly loam	SM	A-4	25-65	0-5	80-100	55-75	40-55	35-45	25-35	NP-10
	35+	Bedrock	---	---	---	---	---	---	---	---	---	---
10:												
Histic Cryaquepts, sandy	0-3	Peat	PT	A-8	0	0	---	---	---	---	0-0	NP
	3-8	Mucky peat	PT	A-8	0	0	---	---	---	---	0-0	NP
	8-65	Sand	SM, SW	A-1, A-2	0	0	100	100	60-85	20-30	0-0	NP
Terric Cryohemists, sandy	0-24	Peat	PT	A-8	0	0	---	---	---	---	0-0	NP
	24-45	Mucky peat	PT	A-8	0	0	---	---	---	---	0-0	NP
	45-52	Muck	PT	A-8	0	0	---	---	---	---	0-0	NP
	52-65	Loamy sand	SM, SW	A-1, A-2	0	0	100	100	60-85	20-30	0-0	NP
11:												
Histic Cryaquepts, tidal	0-3	Peat	PT	A-8	0	0	---	---	---	---	0-0	NP
	3-8	Mucky peat	PT	A-8	0	0	---	---	---	---	0-0	NP
	8-65	Sand	SP-SM	A-1, A-2	0	0	100	100	60-85	20-30	0-0	NP

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
11:												
Typic Cryaquents, tidal	0-2	Peat	PT	A-8	0	0	---	---	---	---	---	---
	2-65	Sand	SP-SM	A-1, A-2	0	0	100	100	60-85	20-30	0-0	NP
12:												
Humic Vitricryands	0-2	Peat	PT	A-8	0	0	---	---	---	---	---	---
	2-5	Very fine sandy loam, fine sandy loam.	ML, MH	A-4, A-5	0	0	90-100	85-100	70-90	50-70	30-60	NP-5
	5-15	Very fine sandy loam, fine sandy loam.	ML, MH	A-4, A-5	0	0	90-100	85-100	70-90	50-70	30-60	NP-5
	15-24	Sandy loam	ML, SM	A-2, A-4	0	0-15	90-100	85-100	65-75	35-50	0-15	NP-5
	24-71	Loamy sand	SP-SM	A-1, A-2	0	0-15	90-100	85-100	60-90	20-50	0-0	NP
	71-77	Silt loam	ML, MH	A-4, A-5	0	0-70	95-100	90-100	85-100	75-90	35-50	NP-5
Vitrandic Dystrocryepts	0-1	Peat	PT	A-8	0	0	---	---	---	---	---	---
	1-3	Medial loamy fine sand.	ML, SM	A-2	0	0	90-100	90-100	70-90	20-40	0-0	NP
	3-13	Sand	SW	A-1, A-2	0	0	95-100	75-100	35-60	20-30	0-0	NP
	13-34	Silt loam	ML, SM	A-2, A-4	0-60	0-60	95-100	95-100	90-100	75-90	35-50	NP-5
	34-55	Loamy sand	SP-SM, SM	A-1, A-2	0	0-50	90-100	85-100	60-85	20-50	0-0	NP
	55+	Gravel	GP	---	0	0-20	0	0	0	0	0-0	NP
13:												
Lithic Cryofolists	0-2	Peat	PT	A-8	5-65	5-45	---	---	---	---	---	---
	2-18	Extremely cobbly muck.	PT	A-8	5-70	5-65	---	---	---	---	---	---
	18+	Bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
14:												
Lithic Haplocryands, gravelly, 10 to 30 percent slopes	0-4	Peat	PT	A-8	0	0	---	---	---	---	---	---
	4-7	Fine sandy loam	ML, SM	A-2, A-4	0	0	100	95-100	70-100	40-65	25-35	NP-10
	7-13	Gravelly fine sandy loam.	ML, SM	A-2, A-4	0	0	50-85	50-80	30-65	15-40	25-35	NP-10
	13-19	Gravelly fine sandy loam.	ML, SM	A-2, A-4	0	0	50-85	50-80	30-65	15-40	25-35	NP-10
	19-21	Very gravelly fine sandy loam.	ML, SM	A-2, A-4	0	0	30-75	30-70	25-35	10-30	25-35	NP-10
	21+	Bedrock	---	---	0	0	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
14:												
Lithic Haplocryands, gravelly, 1 to 8 percent slopes	0-4	Peat	PT	A-8	0	0	---	---	---	---	---	---
	4-7	Fine sandy loam	ML, SM	A-2, A-4	0	0	100	95-100	70-100	40-65	25-35	NP-10
	7-13	Gravelly fine sandy loam.	ML, SM	A-2, A-4	0	0	50-85	50-80	30-65	15-40	25-35	NP-10
	13-19	Gravelly fine sandy loam.	ML, SM	A-2, A-4	0	0	50-85	50-80	30-65	15-40	25-35	NP-10
	19-21	Very gravelly fine sandy loam.	ML, SM	A-2, A-4	0	0	30-75	30-70	25-35	10-30	25-35	NP-10
	21+	Bedrock	---	---	0	0	---	---	---	---	---	---
15:												
Lithic Haplocryands, rubbly	0-2	Stony peat	PT	A-8	40-60	25-40	---	---	---	---	---	---
	2-5	Stony medial silt loam.	MH, ML	A-5, A-4	40-60	25-40	95-100	95-100	70-90	60-70	40-60	NP-5
	5-13	Medial very stony silt loam.	MH, ML	A-5, A-4	40-60	25-40	95-100	95-100	70-90	60-70	40-60	NP-5
	13-19	Very stony medial silt loam.	MH, ML	A-5, A-4	40-60	25-50	95-100	95-100	70-90	60-70	40-60	NP-5
	19+	Bedrock	---	---	---	---	---	---	---	---	---	---
Typic Haplocryands, moderately deep	0-3	Stony mucky peat.	PT	A-8	40-60	25-40	---	---	---	---	---	---
	3-4	Medial very stony silt loam.	MH, ML	A-5, A-4	40-60	25-40	95-100	95-100	70-90	60-70	40-60	NP-5
	4-12	Medial very stony silt loam.	MH, ML	A-5, A-4	40-60	25-40	95-100	95-100	70-90	60-70	40-60	NP-5
	12-35	Cobbly medial silt loam.	MH, ML	A-5, A-4	10-40	30-55	85-95	85-95	65-85	55-65	40-60	NP-5
	35-38	Medial very gravelly silt loam.	ML, MH	A-4, A-5	10-20	10-20	45-70	40-60	30-45	25-45	40-60	NP-5
	38+	Bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
16:												
Lukanin sand---------	0-1	Peat-----------	PT	A-8	0	0	---	---	---	---	---	---
	1-3	Sand-----------	SW, SP-SM	A-2, A-3	0	0	100	100	50-85	20-30	0-0	NP
	3-79	Sand-----------	SW, SP-SM	A-2, A-3	0	0	100	100	50-85	20-30	0-0	NP
17:												
Pits, quarry.												
18:												
Polovina fine sandy loam----------	0-2	Mucky peat-----	PT	A-8	0	0	---	---	---	---	---	---
	2-4	Fine sandy loam	ML, SM	A-2, A-4	0	0	100	100	65-100	35-60	0-15	NP-5
	4-19	Sandy loam-----	ML, SM	A-2, A-4	0	0	100	100	60-85	25-50	0-15	NP-5
	19-37	Medial silt loam.	MH, ML	A-5, A-4	0	0-5	100	100	65-90	60-80	40-60	NP-5
	37-55	Gravelly silt loam.	ML	A-4	0	5-15	70-85	65-85	60-80	60-75	40-60	NP-5
	55+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
19:												
Polovina fine sandy loam----------	0-2	Peat-----------	PT	A-8	0	0	---	---	---	---	---	---
	2-4	Fine sandy loam	ML, SM	A-2, A-4	0	0	100	100	65-100	35-60	0-15	NP-5
	4-19	Medial very fine sandy loam.	ML, MH	A-4, A-5	0	0	100	100	70-100	55-75	30-50	NP-10
	19-34	Medial very fine sandy loam.	ML, MH	A-4, A-5	0-5	0-5	100	100	75-100	60-75	40-60	NP-5
	34-55	Cobbly silt loam.	ML	A-4	0-5	25-50	85-95	80-95	65-90	60-85	30-45	NP-5
	55+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
20:												
Polovina family, moderately deep-----	0-3	Peat-----------	PT	A-8	0	0	---	---	---	---	---	---
	3-7	Medial fine sandy loam.	ML, SM	A-2	0	0	100	100	70-100	40-60	0-15	NP-5
	7-14	Loamy fine sand, medial fine sandy loam.	ML, SM	A-2	0	0	100	100	65-95	35-55	0-15	NP-5
	14-22	Loamy sand, sandy loam.	ML, SM	A-2, A-4	0	0	100	100	60-80	30-40	0-15	NP-5
	22-26	Sand-----------	SW, SP-SM	A-2, A-3	0	0	100	100	45-65	25-30	0-15	NP-5
	26-31	Loamy sand-----	SM	A-2, A-4	0	0	100	100	55-80	20-50	0-15	NP-5
	31-35	Gravelly loam--	ML, SM	A-4	0	0-10	65-80	60-75	40-75	30-60	40-60	10-35
	35+	Bedrock--------	---	---	---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
21:												
Polovina family, very deep	0-4	Peat	PT	A-8	0	0	---	---	---	---	---	---
	4-12	Medial sandy loam.	SM	A-2, A-4	0	0	100	95-100	60-90	30-55	0-15	NP-5
	12-26	Medial sandy loam.	SM	A-2, A-4	0	0	100	95-100	60-90	30-55	0-15	NP-5
	26-63	Cobbly sandy loam.	SM	A-2, A-4	0	25-50	100	95-100	60-90	30-55	0-15	NP-5
	63-73	Very gravelly silt loam.	ML	A-4	0	0-5	40-65	35-60	30-50	20-40	40-60	NP-5
	73+	Bedrock	---	---	---	---	---	---	---	---	---	---
22:												
Polovina family, very deep	0-4	Peat	PT	A-8	0	0	---	---	---	---	---	---
	4-12	Medial sandy loam.	SM	A-2, A-4	0	0	100	95-100	60-90	30-55	0-15	NP-5
	12-26	Medial sandy loam.	SM	A-2, A-4	0	0	100	95-100	60-90	30-55	0-15	NP-5
	26-63	Cobbly sandy loam.	SM	A-2, A-4	0	25-50	100	95-100	60-90	30-55	0-15	NP-5
	63-73	Very gravelly silt loam.	ML	A-4	0	0-5	50-75	45-70	35-60	30-55	40-60	NP-5
	73+	Bedrock	---	---	---	---	---	---	---	---	---	---
23:												
Rock outcrop, basalt.												
24:												
Tsammana sand	0-1	Peat	PT	A-8	0-10	0	---	---	---	---	---	---
	1-3	Sand	SW	A-1	0-10	0-1	100	100	50-80	15-30	0-15	NP-5
	3-5	Sandy loam	SM	A-2, A-4	0-25	0-5	100	100	70-90	40-55	0-15	NP-5
	5-15	Loamy fine sand, medial fine sandy loam.	SM, ML	A-2, A-4	5-40	0-5	100	100	60-90	35-55	0-15	NP-5
	15-34	Very cobbly loamy sand.	SP-SM, SM	A-1, A-2	40-65	0-15	85-100	80-100	55-75	30-45	0-15	NP-5
	34-56	Very cobbly sand.	SW	A-1	40-65	0-15	65-100	65-100	50-80	15-30	0-15	NP-5
	56+	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
25:												
Tsammana sand--------	0-1	Peat-----------	PT	A-8	0-10	0	---	---	---	---	---	---
	1-3	Sand-----------	SW	A-1	0-10	0-1	100	100	50-80	15-30	0-15	NP-5
	3-5	Sandy loam-----	SM, ML	A-2, A-4	0-25	0-5	100	100	70-90	40-55	0-15	NP-5
	5-15	Loamy fine sand, medial fine sandy loam.	SM	A-2, A-4	0-40	0-5	100	100	60-90	35-55	0-15	NP-5
	15-34	Very stony loamy sand.	SP-SM, SM	A-2	40-65	5-15	80-100	80-100	55-75	30-45	0-15	NP-5
	34-56	Very stony sand	SW	A-1	40-65	5-15	65-100	65-100	50-80	15-30	0-15	NP-5
	56+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
Lithic Cryorthents---	0-2	Mucky peat-----	PT	A-8	0-10	0	---	---	---	---	---	---
	2-5	Stony loamy sand.	SM	A-2	40-65	0-15	85-100	80-100	55-75	30-45	0-15	NP-5
	5-17	Very stony loamy sand.	SM, SP-SM	A-1, A-2	50-75	0-15	80-100	100	50-80	15-30	0-15	NP-5
	17+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
26:												
Typic Cryaquents, sandy----------	0-3	Peat-----------	PT	A-8	0	0	---	---	---	---	---	---
	3-16	Sand-----------	SM	A-1, A-2	0	0	100	100	60-90	10-35	0-0	NP
	16-65	Sand-----------	SW	A-1, A-2	0	0	100	100	60-90	10-35	0-0	NP
27:												
Typic Cryaquents, mucky----------	0-7	Muck-----------	PT	A-8	0	0	---	---	---	---	---	---
	7-65	Silt loam------	ML	A-4	0	0	100	100	75-95	70-90	25-35	NP-10
Terric Cryohemists, loamy----------	0-18	Mucky peat-----	PT	A-8	0	0	---	---	---	---	---	---
	18-25	Peat-----------	PT	A-8	0	0	---	---	---	---	---	---
	25-65	Silt loam------	ML	A-4	0	0	100	100	75-95	70-90	25-35	NP-10
28:												
Typic Dystrocryepts, deep----------	0-2	Mucky peat-----	PT	A-8	0	0	---	---	---	---	---	---
	2-7	Sandy loam-----	ML, SM	A-2, A-4	0	0-5	100	100	70-90	35-55	0-15	NP-5
	7-15	Sand, loamy sand.	SM	A-2	20-65	0-10	65-100	75-100	65-85	10-35	0-15	NP-5
	15-31	Sand, sandy loam.	ML, SM	A-2, A-4	20-65	0-10	65-100	75-100	60-85	20-50	0-15	NP-5
	31-45	Sand, sandy loam.	ML, SM	A-2, A-4	20-70	0-15	65-100	75-100	60-80	20-50	0-15	NP-5
	45+	Bedrock--------	---	---	---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
28:												
Typic Dystrocryepts, moderately deep	0-2	Peat	PT	A-8	0	0	---	---	---	---	---	---
	2-4	Fine sandy loam	SM, ML	A-2, A-4	0	0	100	100	65-100	40-70	0-15	NP-5
	4-19	Sandy loam	SM, ML	A-2, A-4	20-65	5-30	100	100	70-90	35-50	0-15	NP-5
	19-33	Gravelly silt loam.	ML	A-4	20-65	5-30	70-85	65-80	50-75	50-70	40-60	NP-5
	33+	Bedrock	---	---	---	---	---	---	---	---	---	---
29:												
Typic Eutrocryepts	0-2	Peat	PT	A-8	0	0	---	---	---	---	---	---
	2-5	Sand	SW	A-1, A-2	0	0-1	100	100	45-70	10-20	0-15	NP-5
	5-7	Fine sandy loam	SM	A-2	0	0	85-100	85-100	70-100	40-70	0-5	NP-5
	7-43	Very gravelly silt loam.	SM, ML	A-4	0	0	40-65	35-60	30-55	20-40	30-50	NP-10
	43-45	Extremely gravelly silt loam.	ML	A-4	0-5	0-5	25-45	25-50	25-45	15-35	30-50	NP-10
	45+	Bedrock	---	---	---	---	---	---	---	---	---	---
30:												
Typic Haplocryands, deep	0-2	Stony peat	PT	A-8	5-40	0-20	---	---	---	---	---	---
	2-8	Stony silt loam	ML, MH	A-4, A-5	5-60	0-40	100	100	65-100	60-80	40-60	NP-5
	8-21	Very stony silt loam.	ML, MH	A-4, A-5	15-65	0-60	85-100	80-100	70-95	55-75	40-60	NP-5
	21-39	Very stony silt loam.	ML, MH	A-4, A-5	15-65	0-35	75-100	75-100	65-90	50-70	40-60	NP-5
	39-44	Very stony silt loam.	ML, MH	A-4, A-5	15-50	0-30	55-100	55-100	50-70	45-65	40-60	NP-5
	44+	Bedrock	---	---	---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
31:												
Typic Haplocryands, moderately deep-----	0-4	Stony mucky peat.	PT	A-8	30-50	5-10	---	---	---	---	---	---
	4-9	Medial extremely stony silt loam.	ML, MH	A-4, A-5	45-90	10-45	85-100	75-95	65-85	45-75	40-60	NP-5
	9-14	Medial extremely stony silt loam.	ML, MH	A-4, A-5	45-90	15-45	85-100	70-85	50-80	45-70	40-60	NP-5
	14-19	Medial stony silt loam.	ML, MH	A-4, A-5	25-50	10-35	85-100	70-85	45-80	45-70	40-60	NP-5
	19-28	Medial very gravelly very fine sandy loam.	ML, MH	A-4, A-5	10-20	5-15	40-70	35-60	30-50	20-40	40-60	NP-5
	28+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
Lithic Haplocryands, rubbly--------------	0-2	Very stony peat	PT	A-8	15-75	10-70	---	---	---	---	---	---
	2-5	Very stony silt loam.	ML, MH	A-4, A-5	15-75	10-70	75-95	65-90	50-85	45-75	40-60	NP-5
	5-12	Very stony silt loam.	ML, MH	A-4, A-5	15-75	10-70	75-95	65-90	50-85	45-75	40-60	NP-5
	12-19	Stony silt loam	ML, MH	A-4, A-5	15-75	10-70	75-95	65-90	50-85	40-70	40-60	NP-5
	19+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
32:												
Typic Vitricryands---	0-2	Peat----------	PT	A-8	0	---	---	---	---	---	---	---
	2-7	Very cobbly silt loam.	ML, MH	A-4, A-5	0	35-65	90-100	85-100	55-80	45-85	35-50	NP-5
	7-17	Very gravelly silt loam.	ML, MH	A-5, A-4	0	15-35	40-70	50-65	50-65	25-50	35-50	NP-5
	17-24	Very gravelly fine sandy loam.	SM	A-2, A-4	0	10-15	45-60	45-55	40-60	25-50	25-35	NP-5
	24-65	Gravel---------	GP	A-1	0	0	5-10	0-10	0-5	0-5	0-0	NP

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
33:												
Typic Vitricryands---	0-1	Peat----------	PT	A-8	0	---	---	---	---	---	---	---
	1-12	Extremely gravelly silt loam.	GP-GM	A-1	0	5-15	20-45	15-25	10-20	5-15	40-60	NP-5
	12-27	Very gravelly silt loam.	GP-GM, SM	A-1, A-2, A-4	0	5-15	50-60	45-55	40-60	25-50	40-60	NP-5
	27-65	Gravel---------	GP-GM	A-1	0	0-10	5-10	0-10	0-5	0-5	---	---
34:												
Urban land.												
35:												
Zapadni fine sandy loam----------	0-2	Peat----------	PT	A-8	0	0	---	---	---	---	---	---
	2-6	Fine sandy loam	SM, ML	A-2, A-4	0	0	100	100	75-90	45-70	0-15	NP-5
	6-10	Fine sandy loam	SM, ML	A-2, A-4	0	0	100	100	70-85	40-70	0-15	NP-5
	10-17	Loamy sand-----	SM	A-2	0	0	100	95-100	65-80	35-55	0-10	NP-5
	17-30	Sand----------	SM	A-2, A-3	0	0	100	90-100	50-85	20-30	0-0	NP
	30-71	Sand----------	SW	A-3	0	0	100	90-100	45-80	15-30	0-0	NP
	71+	Bedrock--------	---	---	---	---	---	---	---	---	---	---
36:												
Zolotoi silt loam----	0-2	Stony mucky peat.	PT	A-8	0-15	0-10	---	---	---	---	---	---
	2-5	Stony medial silt loam.	MH	A-5	0-15	0-10	95-100	90-100	90-100	80-90	70-100	1-10
	5-18	Medial silt loam.	MH	A-5	0	0-5	95-100	90-100	90-100	80-90	80-120	1-10
	18-21	Medial very fine sandy loam.	MH	A-5	0	0-5	100	90-100	95-100	85-90	80-120	1-10
	21-42	Medial stony loam.	MH, ML	A-4, A-5	0-35	5-35	75-100	65-95	60-85	50-65	30-50	NP
	42+	Bedrock--------	---	---	---	---	---	---	---	---	---	---

Table 14.--Engineering Index Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
36:												
Zolotoi silt loam, very stony	0-2	Stony mucky peat.	PT	A-8	30-75	0-10	---	---	---	---	---	---
	2-5	Very stony silt loam.	MH	A-5	30-75	0-10	95-100	90-100	90-100	80-90	60-80	NP-5
	5-18	Medial silt loam.	MH	A-5	15-25	0-5	95-100	90-100	90-100	80-90	80-120	2-5
	18-21	Medial very fine sandy loam.	MH	A-5	15-25	0-5	100	90-100	95-100	85-90	80-120	NP-5
	21-29	Medial stony loam.	ML, MH	A-4, A-5	10-30	5-35	75-100	65-100	60-85	50-65	30-50	NP
	29+	Bedrock	---	---	---	---	---	---	---	---	---	---
37:												
Zolotoi family	0-2	Peat	PT	A-8	0-15	15-55	---	---	---	---	---	---
	2-6	Very cobbly medial silt loam.	ML, MH	A-4, A-5	0-15	15-55	95-100	90-100	90-100	80-90	60-80	1-10
	6-26	Medial silt loam.	ML, MH	A-4, A-5	0-10	5-25	95-100	90-100	90-100	80-90	80-120	1-5
	26-28	Stratified loamy sand to medial silt loam.	ML, SM	A-2, A-4	0-5	0-5	90-100	85-100	80-95	50-70	0-5	NP-5
	28-36	Very gravelly loam.	GM, SM	A-1, A-2, A-4	0-25	0-15	55-75	35-55	30-50	25-40	30-50	NP-10
	36+	Bedrock	---	---	---	---	---	---	---	---	---	---
Einahnuhto silty clay loam	0-2	Mucky peat	PT	A-8	0	0	---	---	---	---	---	---
	2-8	Silty clay loam	CL	A-6	0	0	100	90-100	80-100	80-90	35-55	15-30
	8-15	Silty clay loam	CL	A-6	0	5-10	90-100	90-100	80-95	70-80	35-55	15-30
	15-24	Loam	ML	A-4	0-10	5-25	80-100	80-100	75-90	70-75	30-40	5-15
	24-35	Gravelly loam	ML, SM	A-4	0	0-10	60-80	45-70	40-65	40-60	40-60	10-35
	35+	Bedrock	---	---	---	---	---	---	---	---	---	---
38:												
Water.												

Table 15.--Physical Properties of the Soils

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
1:												
Aquic Dystrocryepts---	0-2	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	3	3	86
	2-4	0-3	1.20-1.40	2-6	0.16-0.17	0.0-2.9	1.0-5.0	.28	.28			
	4-24	0-3	1.25-1.40	6-20	0.05-0.08	0.0-2.9	1.0-2.0	.10	.10			
	24-28	0-3	1.20-1.40	2-6	0.15-0.18	0.0-2.9	0.0-1.0	.15	.15			
	28-55	0-5	1.20-1.40	2-6	0.08-0.15	0.0-2.9	0.0-1.0	.10	.15			
	55+	---	---	---	---	---	---	---	---			
2:												
Aquic Haplocryands----	0-3	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	5	7	38
	3-8	0-3	1.10-1.20	2-6	0.21-0.22	0.0-2.9	1.0-5.0	.15	.24			
	8-16	0-3	1.10-1.20	2-6	0.21-0.22	0.0-2.9	1.0-3.0	.17	.24			
	16-24	0-3	1.10-1.20	2-6	0.21-0.22	0.0-2.9	1.0-2.0	.17	.32			
	24-29	0-3	1.20-1.30	2-6	0.21-0.22	0.0-2.9	0.0-1.0	.17	.32			
	29+	---	---	---	---	---	---	---	---			
Andic Haplocryods-----	0-4	0-0	0.07-0.18	6-20	0.35-0.50	---	75-90	.05	.05	3	4	86
	4-8	5-10	0.60-0.80	2-6	0.33-0.35	0.0-2.9	3.0-6.0	.28	.37			
	8-13	3-5	0.60-0.80	2-6	0.21-0.22	0.0-2.9	2.0-5.0	.32	.43			
	13-35	4-7	1.10-1.20	2-6	0.17-0.18	0.0-2.9	0.0-2.0	.10	.24			
	35-54	4-7	1.10-1.20	2-6	0.17-0.18	0.0-2.9	0.0-2.0	.15	.24			
	54+	---	---	---	---	---	---	---	---			
3, 4, 5:												
Beaches.												
6:												
Bogoslof silt loam----	0-2	0-0	0.07-0.18	6-20	0.05-0.35	---	75-90	.05	.05	5	1	160
	2-4	1-4	0.60-0.90	2-6	0.33-0.34	0.0-2.9	3.0-7.0	.37	.37			
	4-13	1-3	0.70-0.90	2-6	0.30-0.31	0.0-2.9	1.0-3.0	.43	.43			
	13-51	1-3	1.25-1.45	6-20	0.10-0.12	0.0-2.9	0.0-2.0	.15	.15			
	51-75	1-2	1.40-1.50	6-20	0.03-0.05	0.0-2.9	0.0-1.0	.05	.05			
	75-79	1-2	1.25-1.45	2-6	0.03-0.05	---	0.0-1.0	.05	.05			
7:												
Cryofluvents----------	0-3	0-0	0.07-0.18	6-20	0.05-0.35	---	85-95	.05	.05	5	5	56
	3-35	1-3	1.20-1.30	0.6-2	0.13-0.22	0.0-2.9	1.0-7.0	.32	.37			
	35-61	1-3	1.20-1.30	2-6	0.13-0.15	0.0-2.9	1.0-7.0	.32	.37			
	61+	---	---	---	---	---	---	---	---			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
7:												
Spodic Dystrocryepts--	0-3	1-3	0.07-0.18	2-6	0.30-0.40	---	80-90	.05	.05	5	2	134
	3-6	3-5	0.80-1.10	2-6	0.21-0.23	0.0-2.9	3.0-7.0	.24	.28			
	6-13	3-5	0.90-1.20	2-6	0.21-0.23	0.0-2.9	1.0-5.0	.37	.43			
	13-15	4-8	0.60-0.80	2-6	0.33-0.35	0.0-2.9	3.0-7.0	.32	.37			
	15-20	1-2	1.30-1.40	2-6	0.05-0.07	0.0-2.9	1.0-5.0	.17	.17			
	20-79	1-2	1.30-1.40	2-6	0.05-0.07	0.0-2.9	1.0-5.0	.17	.17			
	79+	---	---	---	---	---	---	---	---			
8:												
Dumps, landfill.												
9:												
Einahnuhto silty clay loam----------	0-3	0-0	0.07-0.18	2-6	0.05-0.35	---	85-95	.05	.05	3	7	38
	3-6	28-35	1.30-1.40	0.6-2	0.21-0.23	3.0-5.9	2.0-7.0	.24	.24			
	6-10	28-35	1.40-1.50	0.2-0.6	0.21-0.23	3.0-5.9	1.0-4.0	.17	.20			
	10-20	28-35	1.40-1.50	0.06-0.2	0.23-0.25	3.0-5.9	0.0-1.0	.17	.20			
	20-41	20-28	1.40-1.50	0.2-0.6	0.21-0.25	3.0-5.9	0.0-1.0	.17	.20			
	41+	---	---	---	---	---	---	---	---			
Andic Haplocryods, rubbly----------	0-4	0-0	0.07-0.18	2-6	0.35-0.50	---	75-90	.02	.05	2	4	86
	4-6	1-5	1.10-1.20	0.6-2	0.21-0.22	0.0-2.9	2.0-7.0	.05	.15			
	6-15	1-4	1.20-1.30	2-6	0.21-0.22	0.0-2.9	3.0-5.0	.10	.24			
	15-31	1-5	1.30-1.40	2-6	0.17-0.18	0.0-2.9	1.0-2.0	.10	.24			
	31-35	9-11	1.30-1.40	0.6-2	0.17-0.18	0.0-2.9	0.0-1.0	.10	.24			
	35+	---	---	---	---	---	---	---	---			
10:												
Histic Cryaquepts, sandy----------	0-3	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	5	8	0
	3-8	0-0	0.07-0.18	0.6-2	0.35-0.50	---	75-90	.05	.05			
	8-65	0-2	1.30-1.50	6-20	0.04-0.06	0.0-2.9	1.0-3.0	.15	.15			
Terric Cryohemists, sandy----------	0-24	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	2	8	0
	24-45	0-0	0.07-0.18	0.6-2	0.35-0.50	---	75-90	.05	.05			
	45-52	0-0	0.20-0.30	0.00-0.06	0.45-0.55	---	60-85	.05	.05			
	52-65	0-3	1.40-1.50	0.2-0.6	0.04-0.06	0.0-2.9	2.0-5.0	.15	.15			
11:												
Histic Cryaquepts, tidal----------	0-3	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	5	8	0
	3-8	0-0	0.07-0.18	0.6-2	0.35-0.50	---	75-90	.05	.05			
	8-65	0-0	1.30-1.50	20-101	0.05-0.10	0.0-2.9	0.0-2.0	.15	.15			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
11:												
Typic Cryaquents, tidal----------	0-2	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	5	8	0
	2-65	0-0	1.30-1.50	20-101	0.04-0.06	0.0-2.9	0.0-2.0	.15	.15			
12:												
Humic Vitricryands----	0-2	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	5	2	134
	2-5	0-4	1.10-1.20	2-6	0.17-0.34	0.0-2.9	3.0-7.0	.37	.43			
	5-15	0-3	1.10-1.20	2-6	0.17-0.34	0.0-2.9	2.0-5.0	.43	.55			
	15-24	2-5	1.20-1.40	2-6	0.16-0.18	0.0-2.9	1.0-3.0	.10	.15			
	24-71	1-3	1.30-1.40	6-20	0.04-0.06	0.0-2.9	0.0-0.0	.05	.15			
	71-77	3-10	1.20-1.30	0.6-2	0.09-0.34	0.0-2.9	0.0-0.0	.02	.02			
Vitrandic Dystrocryepts--------	0-1	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	2	3	134
	1-3	0-2	1.25-1.50	6-20	0.04-0.07	0.0-2.9	3.0-5.0	.10	.10			
	3-13	0-2	1.30-1.50	20-101	0.04-0.06	0.0-2.9	1.0-3.0	.15	.15			
	13-34	3-9	1.20-1.30	0.6-2	0.09-0.34	0.0-2.9	1.0-2.0	.15	.20			
	34-55	0-0	1.30-1.50	6-20	0.04-0.08	0.0-2.9	1.0-2.0	.10	.15			
	55+	0-0	1.00-1.10	20-101	0.00-0.00	0.0-2.9	0.0-0.0	.02	.02			
13:												
Lithic Cryofolists----	0-2	0-2	0.05-0.10	6-20	0.15-0.35	---	85-95	.05	.05	1	8	0
	2-18	0-5	0.20-0.30	0.00-0.06	0.45-0.55	---	60-85	.05	.05			
	18+	---	---	---	---	---	---	---	---			
Rock outcrop.												
14:												
Lithic Haplocryands, gravelly, 10 to 30 percent slopes-------	0-4	0-0	0.05-1.00	6-20	0.05-0.35	---	85-95	.05	.05	1	5	56
	4-7	0-8	1.10-1.20	2-6	0.16-0.18	0.0-2.9	3.0-6.0	.17	.28			
	7-13	0-8	1.10-1.20	2-6	0.13-0.15	0.0-2.9	3.0-5.0	.17	.32			
	13-19	0-8	1.10-1.30	2-6	0.17-0.19	0.0-2.9	0.0-2.0	.10	.24			
	19-21	0-8	1.20-1.35	2-6	0.12-0.15	0.0-2.9	0.0-2.0	.05	.15			
	21+	---	---	---	---	---	---	---	---			
Lithic Haplocryands, gravelly, 1 to 8 percent slopes-------	0-4	0-0	0.05-1.00	6-20	0.05-0.35	---	85-95	.05	.05	1	5	56
	4-7	0-8	1.10-1.20	2-6	0.16-0.18	0.0-2.9	3.0-10	.17	.28			
	7-13	0-8	1.10-1.20	2-6	0.13-0.15	0.0-2.9	3.0-5.0	.17	.32			
	13-19	0-8	1.10-1.30	2-6	0.17-0.19	0.0-2.9	0.0-2.0	.10	.24			
	19-21	0-8	1.20-1.35	2-6	0.12-0.15	0.0-2.9	0.0-2.0	.05	.15			
	21+	---	---	---	---	---	---	---	---			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
15:												
Lithic Haplocryands, rubbly	0-2	0-0	0.05-0.10	6-20	0.15-0.35	---	85-95	.02	.05	1	8	0
	2-5	2-5	0.60-0.80	2-6	0.18-0.20	0.0-2.9	3.0-5.0	.05	.32			
	5-13	2-5	0.60-0.80	2-6	0.16-0.18	0.0-2.9	1.0-2.0	.10	.37			
	13-19	2-5	0.60-0.80	2-6	0.16-0.18	0.0-2.9	0.0-2.0	.05	.24			
	19+	---	---	---	---	---	---	---	---			
Typic Haplocryands, moderately deep	0-3	0-0	0.07-0.18	0.6-2	0.35-0.50	---	75-90	.05	.05	2	8	0
	3-4	3-8	0.60-0.80	2-6	0.08-0.10	0.0-2.9	3.0-7.0	.05	.24			
	4-12	3-8	0.60-0.80	2-6	0.11-0.13	0.0-2.9	1.0-5.0	.05	.32			
	12-35	3-8	0.60-0.80	0.6-6	0.11-0.13	0.0-2.9	1.0-5.0	.15	.37			
	35-38	2-5	0.60-0.80	0.6-2	0.10-0.13	0.0-2.9	1.0-2.0	.17	.24			
	38+	---	---	---	---	---	---	---	---			
Rock outcrop.												
16:												
Lukanin sand	0-1	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	5	1	220
	1-3	0-0	1.20-1.40	6-20	0.04-0.06	0.0-2.9	3.0-5.0	.10	.10			
	3-79	0-0	1.30-1.50	20-101	0.04-0.06	0.0-2.9	0.0-1.0	.10	.10			
17:												
Pits, quarry.												
18:												
Polovina fine sandy loam	0-2	0-0	0.07-0.18	0.6-2	0.05-0.35	---	85-95	.05	.05	3	3	86
	2-4	0-0	1.20-1.30	2-6	0.16-0.17	0.0-2.9	3.0-7.0	.17	.17			
	4-19	0-0	0.80-1.00	2-6	0.14-0.15	0.0-2.9	2.0-5.0	.20	.20			
	19-37	0-3	0.60-0.90	2-6	0.21-0.22	0.0-2.9	1.0-1.0	.43	.49			
	37-55	0-3	1.20-1.30	2-6	0.18-0.19	0.0-2.9	0.0-1.0	.43	.49			
	55+	---	---	---	---	---	---	---	---			
19:												
Polovina fine sandy loam	0-2	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	3	3	86
	2-4	0-0	1.20-1.30	2-6	0.16-0.17	0.0-2.9	4.0-6.0	.17	.17			
	4-19	0-3	0.60-0.80	2-6	0.22-0.23	0.0-2.9	3.0-5.0	.49	.49			
	19-34	0-3	0.60-0.80	2-6	0.34-0.35	0.0-2.9	1.0-2.0	.49	.49			
	34-55	0-3	1.20-1.30	2-6	0.08-0.09	0.0-2.9	0.0-1.0	.24	.49			
	55+	---	---	---	---	---	---	---	---			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
20:												
Polovina family, moderately deep	0-3	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	2	3	86
	3-7	0-5	1.00-1.30	2-6	0.16-0.18	0.0-2.9	4.0-12	.20	.20			
	7-14	0-5	1.00-1.30	2-6	0.16-0.18	0.0-2.9	4.0-12	.28	.28			
	14-22	0-2	1.20-1.40	2-6	0.07-0.09	0.0-2.9	1.0-3.0	.28	.28			
	22-26	0-0	1.30-1.50	6-20	0.04-0.06	0.0-2.9	0.0-2.0	.10	.10			
	26-31	0-0	1.20-1.40	6-20	0.07-0.09	0.0-2.9	0.0-2.0	.24	.24			
	31-35	8-27	1.20-1.40	0.2-0.6	0.21-0.23	0.0-2.9	0.0-2.0	.32	.49			
	35+	---	---	---	---	---	---	---	---			
21:												
Polovina family, very deep	0-4	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	5	3	86
	4-12	0-0	1.10-1.20	2-6	0.14-0.16	0.0-2.9	3.0-7.0	.24	.24			
	12-26	0-0	1.10-1.20	2-6	0.14-0.16	0.0-2.9	3.0-6.0	.28	.28			
	26-63	0-3	1.10-1.20	2-6	0.12-0.15	0.0-2.9	1.0-2.0	.24	.37			
	63-73	0-3	1.20-1.30	0.6-2	0.26-0.28	0.0-2.9	0.0-1.0	.17	.43			
	73+	---	---	---	---	---	---	---	---			
22:												
Polovina family, very deep	0-4	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	5	3	86
	4-12	0-0	1.10-1.20	2-6	0.14-0.16	0.0-2.9	3.0-7.0	.24	.24			
	12-26	0-0	1.10-1.20	2-6	0.14-0.16	0.0-2.9	3.0-5.0	.28	.28			
	26-63	0-3	1.10-1.20	2-6	0.12-0.15	0.0-2.9	1.0-2.0	.24	.37			
	63-73	0-3	1.20-1.30	0.6-2	0.26-0.28	0.0-2.9	0.0-1.0	.17	.43			
	73+	---	---	---	---	---	---	---	---			
23:												
Rock outcrop, basalt.												
24:												
Tsammana sand	0-1	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	3	1	180
	1-3	0-0	1.30-1.45	6-20	0.04-0.06	0.0-2.9	1.0-3.0	.05	.05			
	3-5	0-2	1.15-1.30	2-6	0.07-0.09	0.0-2.9	2.0-5.0	.24	.24			
	5-15	0-0	1.20-1.40	2-6	0.04-0.06	0.0-2.9	1.0-3.0	.37	.37			
	15-34	0-0	1.20-1.40	6-20	0.04-0.06	0.0-2.9	0.0-2.0	.10	.28			
	34-56	0-0	1.20-1.40	6-20	0.04-0.06	0.0-2.9	0.0-1.0	.05	.10			
	56+	---	---	---	---	---	---	---	---			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
25:												
Tsammana sand---------	0-1	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	3	1	180
	1-3	0-0	1.30-1.45	6-20	0.04-0.06	0.0-2.9	1.0-4.0	.02	.05			
	3-5	0-2	1.15-1.30	2-6	0.07-0.09	0.0-2.9	3.0-5.0	.20	.24			
	5-15	0-0	1.20-1.40	2-6	0.04-0.06	0.0-2.9	1.0-2.0	.28	.37			
	15-34	0-0	1.20-1.40	6-20	0.04-0.06	0.0-2.9	0.0-2.0	.15	.28			
	34-56	0-0	1.20-1.40	6-20	0.04-0.06	0.0-2.9	0.0-2.0	.05	.10			
	56+	---	---	---	---	---	---	---	---			
Lithic Cryorthents----	0-2	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	1	3	86
	2-5	0-0	1.20-1.40	6-20	0.04-0.05	0.0-2.9	1.0-5.0	.05	.10			
	5-17	0-0	1.20-1.40	6-20	0.04-0.05	0.0-2.9	0.0-3.0	.05	.10			
	17+	---	---	---	---	---	---	---	---			
26:												
Typic Cryaquents, sandy----------	0-3	0-1	0.05-0.10	6-20	0.05-0.35	---	85-95	.02	.02	5	8	0
	3-16	0-1	1.20-1.40	6-20	0.04-0.06	0.0-2.9	1.0-4.0	.10	.10			
	16-65	0-1	1.30-1.50	6-20	0.04-0.06	0.0-2.9	1.0-2.0	.10	.10			
27:												
Typic Cryaquents, mucky----------	0-7	1-2	0.20-0.30	0.00-0.06	0.22-0.34	---	60-85	.05	.05	5	8	0
	7-65	3-6	1.10-1.30	0.6-2	0.22-0.30	0.0-2.9	2.0-4.0	.37	.37			
Terric Cryohemists, loamy----------	0-18	0-0	0.07-0.18	0.6-2	0.35-0.50	---	75-90	.05	.05	5	8	0
	18-25	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05			
	25-65	0-3	1.10-1.30	0.6-2	0.22-0.30	0.0-2.9	2.0-4.0	.37	.37			
28:												
Typic Dystrocryepts, deep----------	0-2	0-0	0.05-0.10	0.6-2	0.05-0.35	---	85-95	.05	.05	3	3	86
	2-7	0-0	1.20-1.30	2-6	0.14-0.15	0.0-2.9	1.0-5.0	.24	.28			
	7-15	0-0	1.20-1.30	2-6	0.05-0.08	0.0-2.9	1.0-3.0	.10	.17			
	15-31	0-0	1.20-1.40	2-6	0.07-0.10	0.0-2.9	1.0-2.0	.17	.32			
	31-45	0-0	1.20-1.40	2-6	0.07-0.10	0.0-2.9	0.0-2.0	.17	.32			
	45+	---	---	---	---	---	---	---	---			
Typic Dystrocryepts, moderately deep------	0-2	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	2	3	86
	2-4	0-0	1.20-1.30	2-6	0.16-0.17	0.0-2.9	1.0-5.0	.20	.24			
	4-19	0-0	1.20-1.40	2-6	0.14-0.15	0.0-2.9	1.0-2.0	.15	.28			
	19-33	0-3	1.20-1.30	2-6	0.18-0.19	0.0-2.9	0.0-2.0	.20	.43			
	33+	---	---	---	---	---	---	---	---			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
29:												
Typic Eutrocryepts----	0-2	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	3	1	86
	2-5	0-0	1.30-1.45	6-20	0.04-0.06	0.0-2.9	1.0-2.0	.10	.10			
	5-7	5-11	1.20-1.30	6-20	0.07-0.09	0.0-2.9	3.0-7.0	.24	.32			
	7-43	8-11	1.20-1.30	0.6-2	0.12-0.14	0.0-2.9	1.0-3.0	.17	.43			
	43-45	8-14	1.20-1.30	0.6-2	0.07-0.09	0.0-2.9	0.0-2.0	.15	.37			
	45+	---	---	---	---	---	---	---	---			
30:												
Typic Haplocryands, deep----------	0-2	0-0	0.05-0.10	0.6-2	0.35-0.50	---	75-90	.05	.05	3	2	86
	2-8	3-8	1.00-1.10	2-6	0.33-0.35	0.0-2.9	3.0-7.0	.17	.32			
	8-21	3-8	1.10-1.20	2-6	0.33-0.35	0.0-2.9	1.0-5.0	.15	.37			
	21-39	3-8	1.10-1.20	0.6-2	0.33-0.35	0.0-2.9	1.0-3.0	.17	.43			
	39-44	2-5	1.20-1.30	0.6-2	0.33-0.35	0.0-2.9	0.0-1.0	.24	.49			
	44+	---	---	---	---	---	---	---	---			
31:												
Typic Haplocryands, moderately deep------	0-4	0-0	0.07-0.18	0.6-2	0.35-0.50	---	75-90	.05	.05	2	8	0
	4-9	3-8	0.70-0.90	2-6	0.08-0.10	0.0-2.9	3.0-7.0	.05	.32			
	9-14	3-8	0.70-0.90	2-6	0.11-0.13	0.0-2.9	1.0-5.0	.05	.37			
	14-19	3-8	1.10-1.20	2-6	0.11-0.13	0.0-2.9	0.0-3.0	.24	.55			
	19-28	2-5	1.20-1.30	0.6-2	0.10-0.13	0.0-2.9	0.0-2.0	.20	.55			
	28+	---	---	---	---	---	---	---	---			
Lithic Haplocryands, rubbly---------------	0-2	0-0	0.05-0.10	6-20	0.15-0.35	---	85-95	.05	.05	1	8	0
	2-5	2-5	0.60-0.90	2-6	0.18-0.20	0.0-2.9	3.0-7.0	.10	.32			
	5-12	2-5	0.60-0.90	2-6	0.18-0.20	0.0-2.9	2.0-3.0	.15	.37			
	12-19	2-5	0.60-0.90	2-6	0.16-0.18	0.0-2.9	1.0-2.0	.15	.43			
	19+	---	---	---	---	---	---	---	---			
32:												
Typic Vitricryands----	0-2	0-0	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.02	2	5	56
	2-7	1-3	0.60-0.90	6-20	0.09-0.10	0.0-2.9	3.0-7.0	.10	.32			
	7-17	1-1	0.60-0.90	6-20	0.18-0.19	0.0-2.9	2.0-5.0	.15	.37			
	17-24	0-1	0.60-0.90	6-20	0.10-0.11	0.0-2.9	1.0-2.0	.15	.37			
	24-65	0-0	1.00-1.20	20-101	0.01-0.02	0.0-2.9	0.0-1.0	---	---			
33:												
Typic Vitricryands----	0-1	---	0.05-0.10	6-20	0.05-0.35	---	85-95	.05	.05	2	8	0
	1-12	0-3	0.70-0.90	20-101	0.09-0.11	0.0-2.9	3.0-7.0	.05	.32			
	12-27	0-1	0.70-0.90	6-20	0.05-0.07	0.0-2.9	1.0-3.0	.15	.37			
	27-65	0-0	1.00-1.10	20-101	0.01-0.02	---	0.0-1.0	---	---			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
34:												
Urban land.												
35:												
Zapadni fine sandy loam	0-2	0-0	0.05-0.10	6-20	0.35-0.50	---	75-90	.05	.05	5	3	86
	2-6	2-5	1.20-1.30	2-6	0.16-0.18	0.0-2.9	3.0-7.0	.15	.15			
	6-10	2-5	1.20-1.30	2-6	0.16-0.18	0.0-2.9	3.0-5.0	.24	.24			
	10-17	2-5	1.30-1.40	6-20	0.07-0.09	0.0-2.9	1.0-2.0	.10	.10			
	17-30	1-3	1.30-1.40	6-20	0.04-0.06	0.0-2.9	0.0-1.0	.10	.10			
	30-71	1-3	1.30-1.40	6-20	0.04-0.06	0.0-2.9	0.0-1.0	.10	.10			
	71+	---	---	---	---	---	---	---	---			
36:												
Zolotoi silt loam	0-2	0-0	0.07-0.18	0.6-2	0.35-0.50	---	75-90	.05	.05	3	2	134
	2-5	0-5	0.50-0.80	2-6	0.21-0.23	0.0-2.9	3.0-5.0	.32	.49			
	5-18	0-5	0.50-0.80	2-6	0.33-0.35	0.0-2.9	1.0-2.0	.43	.55			
	18-21	0-5	0.50-0.80	2-6	0.33-0.35	0.0-2.9	0.0-0.0	.55	.55			
	21-42	12-20	1.30-1.40	0.2-0.6	0.11-0.13	0.0-2.9	0.0-0.0	.24	.43			
	42+	---	---	---	---	---	---	---	---			
Zolotoi silt loam, very stony	0-2	0-0	0.07-0.18	0.6-2	0.35-0.50	---	75-90	.05	.05	2	2	134
	2-5	0-5	0.50-0.80	2-6	0.21-0.23	0.0-2.9	3.0-5.0	.17	.49			
	5-18	0-5	0.50-0.80	2-6	0.33-0.35	0.0-2.9	1.0-2.0	.37	.55			
	18-21	0-5	0.70-0.90	2-6	0.33-0.35	0.0-2.9	0.0-0.0	.55	.55			
	21-29	12-20	1.30-1.50	0.2-0.6	0.11-0.13	0.0-2.9	0.0-0.0	.24	.43			
	29+	---	---	---	---	---	---	---	---			
37:												
Zolotoi family	0-2	0-0	0.07-0.18	0.6-2	0.35-0.50	---	75-90	.05	.05	2	3	86
	2-6	0-5	0.60-0.80	2-6	0.21-0.23	0.0-2.9	3.0-5.0	.17	.43			
	6-26	0-5	0.60-0.80	2-6	0.33-0.35	0.0-2.9	1.0-2.0	.37	.55			
	26-28	0-1	1.20-1.30	6-20	0.08-0.10	0.0-2.9	0.0-2.0	.17	.17			
	28-36	12-20	1.20-1.40	0.2-0.6	0.11-0.13	0.0-2.9	0.0-2.0	.15	.28			
	36+	---	---	---	---	---	---	---	---			
Einahnuhto silty clay loam	0-2	0-0	0.05-0.10	0.6-2	0.35-0.50	---	85-95	.05	.05	3	7	38
	2-8	28-35	1.30-1.40	2-6	0.21-0.23	3.0-5.9	2.0-7.0	.37	.43			
	8-15	28-35	1.30-1.40	0.2-0.6	0.21-0.23	3.0-5.9	1.0-5.0	.43	.49			
	15-24	20-28	1.20-1.30	0.2-0.6	0.23-0.25	3.0-5.9	0.0-2.0	.24	.28			
	24-35	8-27	1.20-1.40	0.2-0.6	0.21-0.23	0.0-2.9	0.0-2.0	.32	.49			
	35+	---	---	---	---	---	---	---	---			

Table 15.--Physical Properties of the Soils--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
								Kw	Kf	T		
	In	Pct	g/cc	In/hr	In/in	Pct	Pct					
38: Water.												

Table 16.--Chemical Properties of the Soils

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction
	In	meq/100g	pH
1:			
Aquic Dystrocryepts-----	0-2	115-155	6.1-6.5
	2-4	5.0-40	5.6-6.5
	4-24	4.0-30	5.6-6.5
	24-28	5.0-15	5.6-6.5
	28-55	5.0-15	5.6-6.5
	55+	---	---
2:			
Aquic Haplocryands------	0-3	115-155	5.6-6.5
	3-8	5.0-40	5.6-6.5
	8-16	5.0-30	5.6-6.5
	16-24	25-40	5.6-6.5
	24-29	25-40	5.6-6.5
	29+	---	---
Andic Haplocryods-------	0-4	120-210	5.1-6.0
	4-8	---	5.1-6.0
	8-13	---	5.1-6.0
	13-35	---	5.1-6.0
	35-54	---	5.1-6.0
	54+	---	---
3, 4, 5:			
Beaches.			
6:			
Bogoslof silt loam------	0-2	120-220	6.1-7.3
	2-4	---	5.6-6.5
	4-13	---	5.6-6.5
	13-51	---	6.1-7.3
	51-75	---	6.6-7.3
	75-79	---	6.6-7.3
7:			
Cryofluvents------------	0-3	115-155	6.1-6.5
	3-35	---	6.1-6.5
	35-61	---	6.1-6.5
	61+	---	---
Spodic Dystrocryepts----	0-3	120-210	6.1-6.5
	3-6	---	6.1-6.5
	6-13	---	6.1-6.5
	13-15	---	6.1-6.5
	15-20	---	6.1-6.5
	20-79	---	6.1-6.5
	79+	---	---
8:			
Dumps, landfill.			

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction
	In	meq/100g	pH
9:			
Einahnuhto silty clay loam	0-3	115-155	5.6-6.0
	3-6	---	5.1-5.5
	6-10	---	5.6-6.0
	10-20	---	5.6-6.0
	20-41	---	5.6-6.0
	41+	---	---
Andic Haplocryods, rubbly	0-4	120-210	5.6-6.5
	4-6	---	5.6-6.5
	6-15	---	5.6-6.5
	15-31	---	5.6-6.5
	31-35	---	5.6-6.5
	35+	---	---
10:			
Histic Cryaquepts, sandy	0-3	115-155	6.1-6.5
	3-8	120-210	5.6-6.0
	8-65	5.0-15	5.6-6.0
Terric Cryohemists, sandy	0-24	115-155	5.6-6.5
	24-45	120-210	5.1-6.5
	45-52	120-240	5.6-6.5
	52-65	---	5.6-6.5
11:			
Histic Cryaquepts, tidal	0-3	115-155	6.6-7.3
	3-8	120-210	6.6-7.3
	8-65	0.0-10	7.4-7.8
Typic Cryaquents, tidal	0-2	115-155	6.6-7.3
	2-65	5.0-15	7.4-7.8
12:			
Humic Vitricryands	0-2	115-155	5.6-6.5
	2-5	---	5.6-6.5
	5-15	---	5.6-6.5
	15-24	---	5.6-6.5
	24-71	---	6.1-6.5
	71-77	---	6.1-7.3
Vitrandic Dystrocryepts	0-1	115-155	5.6-6.5
	1-3	5.0-40	5.6-6.5
	3-13	5.0-15	6.1-6.5
	13-34	10-35	6.1-6.5
	34-55	5.0-10	6.6-7.3
	55+	0.0-0.0	---
13:			
Lithic Cryofolists	0-2	115-155	6.1-6.5
	2-18	120-240	5.6-6.5
	18+	---	---
Rock outcrop.			

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction
	In	meq/100g	pH
14:			
Lithic Haplocryands, gravelly, 10 to 30 percent slopes	0-4	---	6.1-6.5
	4-7	---	5.6-6.0
	7-13	---	5.6-6.0
	13-19	---	5.6-6.0
	19-21	---	5.6-6.0
	21+	---	---
Lithic Haplocryands, gravelly, 1 to 8 percent slopes	0-4	---	6.1-6.5
	4-7	---	5.6-6.0
	7-13	---	5.6-6.0
	13-19	---	5.6-6.0
	19-21	---	5.6-6.0
	21+	---	---
15:			
Lithic Haplocryands, rubbly	0-2	115-155	6.1-6.5
	2-5	---	5.6-6.5
	5-13	---	5.6-6.5
	13-19	---	5.6-6.5
	19+	---	---
Typic Haplocryands, moderately deep	0-3	120-210	5.6-6.5
	3-4	---	5.6-6.5
	4-12	---	5.6-6.5
	12-35	---	5.6-6.5
	35-38	---	5.6-6.5
	38+	---	---
Rock outcrop.			
16:			
Lukanin sand	0-1	115-155	5.6-6.5
	1-3	10-25	6.1-7.3
	3-79	5.0-15	6.1-7.3
17:			
Pits, quarry.			
18:			
Polovina fine sandy loam	0-2	115-155	5.6-6.5
	2-4	5.0-40	5.6-6.5
	4-19	5.0-30	5.6-6.5
	19-37	25-40	5.6-6.5
	37-55	25-40	5.6-6.5
	55+	---	---
19:			
Polovina fine sandy loam	0-2	115-155	5.6-6.5
	2-4	---	5.6-6.5
	4-19	---	5.6-6.5
	19-34	---	5.6-6.5
	34-55	---	5.6-6.5
	55+	---	---

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction
	In	meq/100g	pH
20:			
Polovina family, moderately deep	0-3	115-155	6.1-6.5
	3-7	---	6.1-6.5
	7-14	---	6.1-6.5
	14-22	---	6.1-6.5
	22-26	---	6.1-6.5
	26-31	---	6.1-6.5
	31-35	---	6.1-6.5
	35+	---	---
21:			
Polovina family, very deep	0-4	115-155	6.6-7.3
	4-12	5.0-40	6.6-7.3
	12-26	5.0-30	6.6-7.3
	26-63	25-40	6.1-6.5
	63-73	25-40	6.1-6.5
	73+	---	---
22:			
Polovina family, very deep	0-4	115-155	6.6-7.3
	4-12	5.0-40	6.6-7.3
	12-26	5.0-30	6.6-7.3
	26-63	25-40	6.1-6.5
	63-73	25-40	6.1-6.5
	73+	---	---
23:			
Rock outcrop, basalt.			
24:			
Tsammana sand	0-1	115-155	5.1-6.0
	1-3	5.0-40	5.1-6.0
	3-5	10-75	5.1-6.0
	5-15	4.0-30	5.1-6.0
	15-34	5.0-15	5.1-6.0
	34-56	5.0-15	4.5-5.5
	56+	---	---
25:			
Tsammana sand	0-1	115-155	5.1-6.0
	1-3	5.0-40	5.1-6.0
	3-5	10-75	5.1-6.0
	5-15	4.0-30	5.1-6.0
	15-34	5.0-15	5.1-6.0
	34-56	5.0-15	4.5-5.5
	56+	---	---
Lithic Cryorthents	0-2	115-155	5.6-6.5
	2-5	5.0-40	5.6-6.5
	5-17	5.0-15	5.6-6.5
	17+	---	---
26:			
Typic Cryaquents, sandy	0-3	115-150	6.1-6.5
	3-16	---	6.1-6.5
	16-65	---	6.6-7.3

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction
	In	meq/100g	pH
27:			
Typic Cryaquents, mucky	0-7	---	6.1-7.3
	7-65	---	6.1-7.3
Terric Cryohemists, loamy	0-18	120-210	6.1-6.5
	18-25	115-155	6.1-6.5
	25-65	---	6.1-6.5
28:			
Typic Dystrocryepts, deep	0-2	115-155	5.6-6.1
	2-7	5.0-40	5.6-6.1
	7-15	5.0-30	5.6-6.1
	15-31	5.0-15	5.6-6.1
	31-45	5.0-15	5.6-6.1
	45+	---	---
Typic Dystrocryepts, moderately deep	0-2	115-155	5.6-6.5
	2-4	5.0-40	5.6-6.5
	4-19	5.0-30	5.6-6.5
	19-33	25-40	5.6-6.5
	33+	---	---
29:			
Typic Eutrocryepts	0-2	115-155	6.6-7.3
	2-5	5.0-40	6.6-7.3
	5-7	---	6.6-7.3
	7-43	---	6.6-7.8
	43-45	---	7.4-7.8
	45+	---	---
30:			
Typic Haplocryands, deep	0-2	120-210	5.6-6.5
	2-8	---	5.6-6.5
	8-21	---	5.6-6.5
	21-39	---	5.6-6.5
	39-44	---	5.6-7.3
	44+	---	---
31:			
Typic Haplocryands, moderately deep	0-4	120-210	4.5-6.0
	4-9	---	4.5-6.0
	9-14	---	4.5-6.0
	14-19	---	4.5-6.0
	19-28	---	5.6-6.0
	28+	---	---
Lithic Haplocryands, rubbly	0-2	115-155	5.6-6.5
	2-5	---	5.6-6.0
	5-12	---	5.6-6.0
	12-19	---	5.6-6.5
	19+	---	---

Table 16.--Chemical Properties of the Soils--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Soil reaction
	In	meq/100g	pH
32:			
Typic Vitricryands------	0-2	115-155	5.6-6.0
	2-7	---	5.6-6.0
	7-17	---	5.6-6.0
	17-24	---	5.6-6.0
	24-65	---	---
33:			
Typic Vitricryands------	0-1	115-155	6.1-6.5
	1-12	---	6.1-6.5
	12-27	---	6.1-6.5
	27-65	---	---
34:			
Urban land.			
35:			
Zapadni fine sandy loam	0-2	120-210	5.6-6.0
	2-6	---	5.6-6.0
	6-10	---	5.6-6.0
	10-17	---	5.6-6.0
	17-30	---	5.6-6.5
	30-71	---	5.6-6.5
	71+	---	---
36:			
Zolotoi silt loam-------	0-2	120-210	5.1-5.5
	2-5	---	4.5-5.0
	5-18	---	4.5-5.0
	18-21	---	5.6-6.5
	21-42	---	5.6-6.5
	42+	---	---
Zolotoi silt loam, very stony------------------	0-2	120-210	5.1-5.5
	2-5	---	4.5-5.0
	5-18	---	4.5-5.0
	18-21	---	5.6-6.5
	21-29	---	5.6-6.5
	29+	---	---
37:			
Zolotoi family----------	0-2	120-210	5.1-6.0
	2-6	---	5.1-6.0
	6-26	---	5.1-6.0
	26-28	---	6.1-7.3
	28-36	---	6.1-7.3
	36+	---	---
Einahnuhto silty clay loam------------------	0-2	115-155	5.6-6.0
	2-8	---	5.1-5.5
	8-15	---	5.6-6.0
	15-24	---	5.6-6.0
	24-35	---	6.1-6.5
	35+	---	---
38:			
Water.			

Table 17.--Water Features

(See text for definitions of terms used in this table. An entry of ">6.0" for Lower limit indicates that wet soil may continue below a depth of 6.0 feet. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydrologic group	Month	Wet soil		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
1:									
Aquic Dystrocryepts	C								
		January	2.3	>6.0	---	---	None	---	None
		February	2.3	>6.0	---	---	None	---	None
		March	2.3	>6.0	---	---	None	---	None
		April	2.3	>6.0	---	---	Rare	---	None
		May	2.3	>6.0	---	---	Rare	---	None
		June	2.3	>6.0	---	---	None	---	None
		July	2.3	>6.0	---	---	None	---	None
		August	2.3	>6.0	---	---	None	---	None
		September	2.3	>6.0	---	---	None	---	None
		October	2.3	>6.0	---	---	None	---	None
		November	2.3	>6.0	---	---	None	---	None
		December	2.3	>6.0	---	---	None	---	None
2:									
Aquic Haplocryands	C								
		Jan-Dec	---	---	---	---	None	---	None
Andic Haplocryods	B								
		Jan-Dec	---	---	---	---	None	---	None
3:									
Beaches, rocky	---								
		Jan-Dec	---	---	---	---	None	---	Very frequent
4:									
Beaches, sandy	---								
		Jan-Dec	---	---	---	---	None	---	Very frequent
5:									
Beaches, tidal	---								
		Jan-Dec	---	---	---	---	None	---	Very frequent
6:									
Bogoslof silt loam	B								
		Jan-Dec	---	---	---	---	None	---	None
7:									
Cryofluvents	B								
		January	---	---	---	---	None	---	None
		February	---	---	---	---	None	---	None
		March	---	---	---	---	None	---	None
		April	---	---	---	---	None	---	Rare
		May	---	---	---	---	None	---	Rare
		June	---	---	---	---	None	---	Rare
		July	---	---	---	---	None	---	Rare
		August	---	---	---	---	None	---	Rare
		September	---	---	---	---	None	---	Rare
		October	---	---	---	---	None	---	None
		November	---	---	---	---	None	---	None
		December	---	---	---	---	None	---	None
Spodic Dystrocryepts	B								
		Jan-Dec	---	---	---	---	None	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Wet soil: Upper limit	Wet soil: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			Ft	Ft	Ft				
8:									
Dumps, landfill.									
9:									
Einahnuhto silty clay loam	C								
		Jan-Dec	---	---	---	---	None	---	None
Andic Haplocryods, rubbly	B								
		Jan-Dec	---	---	---	---	None	---	None
10:									
Histic Cryaquepts, sandy	C								
		January	0.9	>6.0	---	---	None	---	None
		February	0.9	>6.0	---	---	None	---	None
		March	0.9	>6.0	---	---	None	---	None
		April	0.9	>6.0	---	---	None	---	None
		May	0.9	>6.0	1.0	Long	Frequent	---	None
		June	0.9	>6.0	1.0	Brief	Frequent	---	None
		July	0.9	>6.0	1.0	Brief	Frequent	---	None
		August	0.9	>6.0	1.0	Brief	Frequent	---	None
		September	0.9	>6.0	1.0	Brief	Frequent	---	None
		October	1.6	>6.0	---	---	None	---	None
		November	1.6	>6.0	---	---	None	---	None
		December	1.6	>6.0	---	---	None	---	None
Terric Cryohemists, sandy	D								
		Jan-Dec	1.6	>6.0	1.0	Very long	Frequent	---	None
11:									
Histic Cryaquepts, tidal	D								
		Jan-Dec	1.5	>6.0	---	---	None	Extremely brief	Very frequent
Typic Cryaquents, tidal	D								
		Jan-Dec	0.7	>6.0	---	---	None	Extremely brief	Very frequent
12:									
Humic Vitricryands	B								
		Jan-Dec	---	---	---	---	None	---	None
Vitrandic Dystrocryepts	B								
		Jan-Dec	---	---	---	---	None	---	None
13:									
Lithic Cryofolists	D								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop.									
14:									
Lithic Haplocryands, gravelly, 10 to 30 percent slopes	D								
		Jan-Dec	---	---	---	---	None	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Wet soil		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
14:									
Lithic Haplocryands, gravelly, 1 to 8 percent slopes	D								
		Jan-Dec	---	---	---	---	None	---	None
15:									
Lithic Haplocryands, rubbly	C								
		Jan-Dec	---	---	---	---	None	---	None
Typic Haplocryands, moderately deep	B								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop.									
16:									
Lukanin sand	A								
		Jan-Dec	---	---	---	---	None	---	None
17:									
Pits, quarry.									
18:									
Polovina fine sandy loam	B								
		Jan-Dec	---	---	---	---	None	---	None
19:									
Polovina fine sandy loam	B								
		Jan-Dec	---	---	---	---	None	---	None
20:									
Polovina family, moderately deep	B								
		Jan-Dec	---	---	---	---	None	---	None
21:									
Polovina family, very deep	B								
		Jan-Dec	---	---	---	---	None	---	None
22:									
Polovina family, very deep	B								
		Jan-Dec	---	---	---	---	None	---	None
23:									
Rock outcrop, basalt.									
24:									
Tsammana sand	B								
		Jan-Dec	---	---	---	---	None	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Wet soil		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
25:									
Tsammana sand	B								
		Jan-Dec	---	---	---	---	None	---	None
Lithic Cryorthents	D								
		Jan-Dec	---	---	---	---	None	---	None
26:									
Typic Cryaquents, sandy	D								
		Jan-Dec	0.0	>6.0	0.3	Long	Frequent	---	None
27:									
Typic Cryaquents, mucky	D								
		January	---	---	---	---	None	---	None
		February	---	---	---	---	None	---	None
		March	---	---	---	---	None	---	None
		April	---	---	---	---	None	---	None
		May	---	---	---	Brief	Frequent	---	None
		June	---	---	---	Brief	Frequent	---	None
		July	---	---	---	Brief	Frequent	---	None
		August	---	---	---	Brief	Frequent	---	None
		September	---	---	---	Brief	Frequent	---	None
		October	---	---	---	---	None	---	None
		November	---	---	---	---	None	---	None
		December	---	---	---	---	None	---	None
Terric Cryohemists, loamy	D								
		Jan-Dec	0.0	>6.0	0.3	Long	Frequent	---	None
28:									
Typic Dystrocryepts, deep	B								
		Jan-Dec	---	---	---	---	None	---	None
Typic Dystrocryepts, moderately deep	B								
		Jan-Dec	---	---	---	---	None	---	None
29:									
Typic Eutrocryepts	B								
		Jan-Dec	---	---	---	---	None	---	None
30:									
Typic Haplocryands, deep	B								
		Jan-Dec	---	---	---	---	None	---	None
31:									
Typic Haplocryands, moderately deep	D								
		Jan-Dec	---	---	---	---	None	---	None
Lithic Haplocryands, rubbly	D								
		Jan-Dec	---	---	---	---	None	---	None
32:									
Typic Vitricryands	A								
		Jan-Dec	---	---	---	---	None	---	None

Table 17.--Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Wet soil		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			Ft	Ft	Ft				
33:									
Typic Vitricryands	A	Jan-Dec	---	---	---	---	None	---	None
34:									
Urban land.									
35:									
Zapadni fine sandy loam	A	Jan-Dec	---	---	---	---	None	---	None
36:									
Zolotoi silt loam	B	Jan-Dec	---	---	---	---	None	---	None
Zolotoi silt loam, very stony	B	Jan-Dec	---	---	---	---	None	---	None
37:									
Zolotoi family	B	Jan-Dec	---	---	---	---	None	---	None
Einahnuhto silty clay loam	C	Jan-Dec	---	---	---	---	None	---	None
38:									
Water.									

Table 18.--Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	In		In	In			
1:									
Aquic Dystrocryepts	Bedrock (lithic)	39-79	---	---	---	---	Moderate	Low	Low
2:									
Aquic Haplocryands	Bedrock (lithic)	20-59	---	Indurated	---	---	High	Moderate	Moderate
Andic Haplocryods	Bedrock (lithic)	20-59	---	Indurated	---	---	High	Moderate	Moderate
3, 4, 5:									
Beaches.									
6:									
Bogoslof silt loam	---	---	---	---	---	---	Moderate	Low	Moderate
7:									
Cryofluvents	Bedrock (lithic)	59-79	---	Indurated	---	---	Moderate	Moderate	Moderate
Spodic Dystrocryepts	Bedrock (lithic)	39-79	---	Indurated	---	---	Moderate	Moderate	Moderate
8:									
Dumps, landfill.									
9:									
Einahnuhto silty clay loam	Bedrock (lithic)	20-39	---	Indurated	---	---	Moderate	High	Moderate
Andic Haplocryods, rubbly	Bedrock (lithic)	20-39	---	Indurated	---	---	High	Moderate	Moderate
10:									
Histic Cryaquepts, sandy	---	---	---	---	0-4	0-8	Moderate	High	High
Terric Cryohemists, sandy	---	---	---	---	0-10	0-22	Low	High	High
11:									
Histic Cryaquepts, tidal	---	---	---	---	0-3	0-6	Moderate	High	High
Typic Cryaquents, tidal	---	---	---	---	---	---	Moderate	High	High

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	In		In	In			
12:									
Humic Vitricryands	---	---	---	---	---	---	High	Low	Moderate
Vitrandic Dystrocryepts	---	---	---	---	---	---	Moderate	Low	Moderate
13:									
Lithic Cryofolists	Bedrock (lithic)	10-20	---	Indurated	---	---	High	Moderate	Moderate
Rock outcrop.									
14:									
Lithic Haplocryands, gravelly, 10 to 30 percent slopes	Bedrock (lithic)	10-20	---	Indurated	---	---	High	Moderate	Moderate
Lithic Haplocryands, gravelly, 1 to 8 percent slopes	Bedrock (lithic)	10-20	---	Indurated	---	---	High	Moderate	Moderate
15:									
Lithic Haplocryands, rubbly	Bedrock (lithic)	10-20	---	Indurated	---	---	Moderate	Moderate	Moderate
Typic Haplocryands, moderately deep	Bedrock (lithic)	20-39	---	Indurated	---	---	Moderate	Moderate	Moderate
Rock outcrop.									
16:									
Lukanin sand	---	---	---	---	---	---	Low	Low	Moderate
17:									
Pits, quarry.									
18:									
Polovina fine sandy loam	Bedrock (lithic)	39-59	---	Indurated	---	---	High	Moderate	Moderate
19:									
Polovina fine sandy loam	Bedrock (lithic)	39-59	---	Indurated	---	---	High	Moderate	Low
20:									
Polovina family, moderately deep	Bedrock (lithic)	20-39	---	Indurated	---	---	High	Moderate	Moderate

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	In		In	In			
21: Polovina family, very deep	Bedrock (lithic)	59-79	---	Indurated	---	---	High	Moderate	Low
22: Polovina family, very deep	Bedrock (lithic)	59-79	---	Indurated	---	---	High	Moderate	Low
23: Rock outcrop, basalt.									
24: Tsammana sand	Bedrock (lithic)	39-59	---	Indurated	---	---	Low	Low	Low
25: Tsammana sand	Bedrock (lithic)	39-59	---	Indurated	---	---	Low	Low	Moderate
Lithic Cryorthents	Bedrock (lithic)	12-20	---	Indurated	---	---	Low	Low	Moderate
26: Typic Cryaquents, sandy	---	---	---	---	---	---	Moderate	High	High
27: Typic Cryaquents, mucky	---	---	---	---	---	---	Moderate	Moderate	Low
Terric Cryohemists, loamy	---	---	---	---	0-8	0-20	Moderate	Moderate	Low
28: Typic Dystrocryepts, deep	Bedrock (lithic)	39-59	---	Indurated	---	---	Low	Low	Low
Typic Dystrocryepts, moderately deep	Bedrock (lithic)	20-39	---	Indurated	---	---	Moderate	Low	Low
29: Typic Eutrocryepts	Bedrock (lithic)	40-59	---	Indurated	---	---	Moderate	Moderate	Low
30: Typic Haplocryands, deep	Bedrock (lithic)	39-59	---	Indurated	---	---	Moderate	Moderate	Low
31: Typic Haplocryands, moderately deep	Bedrock (lithic)	20-39	---	Indurated	---	---	Moderate	Low	Low

Table 18.--Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	In		In	In			
31: Lithic Haplocryands, rubbly	Bedrock (lithic)	10-20	---	Indurated	---	---	Moderate	Low	Low
32: Typic Vitricryands	---	---	---	---	---	---	Moderate	Low	Low
33: Typic Vitricryands	---	---	---	---	---	---	Moderate	Low	Low
34: Urban land.									
35: Zapadni fine sandy loam	Bedrock (lithic)	59-79	---	Indurated	---	---	Low	Low	Moderate
36: Zolotoi silt loam	Bedrock (lithic)	39-59	---	Indurated	---	---	High	Moderate	Moderate
Zolotoi silt loam, very stony	Bedrock (lithic)	20-39	---	Indurated	---	---	High	Moderate	Moderate
37: Zolotoi family	Bedrock (lithic)	35-59	---	Indurated	---	---	High	Moderate	Low
Einahnuhto silty clay loam	Bedrock (lithic)	20-39	---	Indurated	---	---	Moderate	Moderate	Low
38: Water.									

Table 19.--Classification of the Soils

Soil name	Family or higher taxonomic class
Andic Haplocryods	Andic Haplocryods
Aquic Dystrocryepts	Aquic Dystrocryepts
Aquic Haplocryands	Aquic Haplocryands
Bogoslof	Medial over sandy or sandy-skeletal, amorphic over mixed Vitrandic Dystrocryepts
Cryofluvents	Cryofluvents
Einahnuhto	Fine-loamy, isotic Vitrandic Eutrocryepts
Histic Cryaquepts	Histic Cryaquepts
Humic Vitricryands	Humic Vitricryands
Lithic Cryofolists	Lithic Cryofolists
Lithic Cryorthents	Lithic Cryorthents
Lithic Haplocryands	Lithic Haplocryands
Lukanin	Mixed Typic Cryopsamments
Polovina	Medial, amorphic Humic Vitricryands
Polovina Family	Medial, amorphic Humic Vitricryands
Spodic Dystrocryepts	Spodic Dystrocryepts
Terric Cryohemists	Terric Cryohemists
Tsammana	Medial over sandy or sandy-skeletal, isotic over mixed Vitrandic Dystrocryepts
Typic Cryaquents	Typic Cryaquents
Typic Dystrocryepts	Typic Dystrocryepts
Typic Eutrocryepts	Typic Eutrocryepts
Typic Haplocryands	Typic Haplocryands
Typic Vitricryands	Typic Vitricryands
Vitrandic Dystrocryepts	Vitrandic Dystrocryepts
Zapadni	Sandy, mixed Andic Haplocryods
Zolotoi	Medial, amorphic Alic Haplocryands
Zolotoi Family	Medial, amorphic Alic Haplocryands

Appendix—Nontechnical Ecological Site Descriptions

Site Name: Beach Dunes and Ridges

Site number: 179Xb050AK

Features.—This site is characterized by sand dunes and sandy/gravelly beach ridges that run parallel to the coasts of the Bering Sea. Elevations range from sea level to 120 feet above sea level. Slopes are 0 to 100 percent.

Vegetation.—Lyme grass (Elymus mollis), red fescue (Festuca rubra), bluegrass (Poa spp.), and sedge (Carex spp.) characterize this site. Major forbs are Pacific hemlock-parsley (Conioselinum chinense), wild celery (Angelica lucida), and Nootka lupine (Lupinus nootkatensis).

Soils.—The soils are very deep and well drained. They are coarse textured, and soil pH is slightly acid. Runoff is very low, and permeability is very rapid.

Vegetation composition and production (air-dry).—Sedges and grasses make up 45 percent of the composition, and forbs make up 55 percent. Total annual vascular herbage production is 3,980 pounds/acre.

Value for grazing reindeer.—This site has very little grazing value for reindeer. Winter forage is of low quality, and lyme grass is not selected by reindeer and is seldom utilized. The site is frequently used for cover from storm winds during winter and for an insect relief area during summer, where reindeer take advantage of offshore breezes. This site is generally available for use as a resting area and is one of the more snowfree sites in the survey area.

Site Name: Beach Dunes and Ridges (Old)

Site number: 179Xb054AK

Features.—This site occurs on the inland side of active beach dunes and beach ridges. The site is comparable to Beach Dunes and Ridges. Because of the inland nature and development of this site, relief is smoother and the site more stable than the more recent Beach Dunes and Ridges. This site consists of low discontinuous rounded sand ridges that have been deposited by high-velocity winds from active Beach Dunes and Ridges and Sandy Beach sites. Elevations range from 40 to 80 feet above sea level. Slopes are 0 to 30 percent.

Vegetation.—The site is characterized by lyme grass (Elymus mollis), red fescue (Festuca rubra), bluegrass (Poa spp.), spike trisetum (Trisetum spicatum), sedge (Carex spp.), and Gmelin's sedge (Carex gmelinii). Major forbs are Nootka lupine (Lupinus nootkatensis), wild celery (Angelica lucida), Pacific hemlock-parsley (Conioselinum chinense), sea peavine (Lathyrus maritimus), Aleutian violet (Viola langsddorfii), field horsetail (Equisetum arvense), Hornemann's willow herb (Epilobium behringianum), whorled lousewort (Pedicularis verticillata), common scurvy grass (Cochlearia officinalis), Siberian aster (Aster sibiricus), and monkshood (Acotinum delphinifolium).

Soils.—The soils are deep or very deep and are well drained. Textures are medium to coarse, and soil pH is moderately acid or slightly acid. Runoff is very low, and permeability is moderately rapid to very rapid.

Vegetation composition and production (air-dry).—Sedges and grasses make up 40 percent of the composition, and forbs make up 60 percent. Total annual vascular herbage production is 4,100 pounds/acre.

Value for grazing reindeer.—The grass portion of the vegetation production for this site has very little grazing value for reindeer. Winter forage is of low quality. Reindeer do not utilize lyme grass to any great extent, even during spring and summer. The large variety of forbs provides excellent spring and summer forage.

Site Name: Crowberry (Lowland)

Site number: 179Xb030AK

Features.—This site occurs on flat plains and flat broad ridges on sandy plains. Elevations range from 30 to 240 feet. Slopes are 0 to 8 percent.

Vegetation.—The dominant vegetation is black crowberry (Empetrum nigrum), long awn sedge (Carex macrochaeta), and Bering's tufted hairgrass (Deschampsia cespitosa). Forbs are wild celery (Angelica lucida), cloudberry (Rubus chamaemorus), and saxifrage (Saxifraga spp.). Lichens make up the understory. Fruticose lichen species are Cladina arbuscula, C. rangiferina, Cladonia amaurocraea, and Thamnolia spp.

Soils.—The soils are moderately deep to very deep and are well drained. They are medium textured, and soil pH ranges from strongly acid to slightly acid. Runoff is low or very low, and permeability is moderately rapid or rapid in the upper part.

Vegetation composition and production (air-dry).—Shrubs make up about 75 percent of the composition, sedges and grasses make up 20 percent, and forbs make up about 5 percent. Total annual vascular herbage production is 840 pounds/acre. Total live lichen biomass is 3,000 pounds/acre.

Value for grazing reindeer.—Because of the high subsistence value and use of black crowberry berries, this site should only be lightly grazed. Reindeer have a tendency to concentrate on this site because they are attracted to the lichens during winter.

Site Name: Crowberry (Upland)

Site number: 179Xb032AK

Features.—This site occurs on shoulders and backslopes of ridges associated with volcanic cones and on very steep side slopes of ridges associated with volcanic cones. Elevations range from 120 to 300 feet. Slopes are 0 to 120 percent.

Vegetation.—The dominant vegetation is black crowberry (Empetrum nigrum), long awn sedge (Carex macrochaeta), and Bering's tufted hairgrass (Deschampsia cespitosa). Forbs are wild celery (Angelica lucida), cloudberry (Rubus chamaemorus), and saxifrage (Saxifraga spp.). Lichens make up the understory of the black crowberry stand. Common fruticose lichens are Cladina arbuscula, C. rangiferina, Cladonia amaurocraea, and Thamnolia spp.

Soils.—The soils are moderately deep and are well drained. Surface texture is gravelly silt loam, which overlies gravel-sized scoria. Soil pH is moderately acid. Runoff is very low, and permeability is rapid or very rapid.

Vegetation composition and production (air-dry).—Shrubs make up about 75 percent of the composition, sedges and grasses make up 20 percent, and forbs make up 5 percent. Total annual vascular herbage production is 840 pounds/acre. Total live lichen biomass is 3,000 pounds/acre. Moss biomass is high and suppresses production of this site.

Value for grazing reindeer.—Because of the high subsistence value and use of black crowberry berries, this site should only be lightly grazed. Reindeer have a tendency to concentrate on this site because they are attracted to the lichens during winter.

Site Name: Dwarf Shrub Tundra

Site number: 179Xb033AK

Features.—This site occurs on gently sloping broad summits of hills near the coast. There are a few rock outcrops and incipient drainageways. Elevations range from 200 to 250 feet above sea level, and slopes are 1 to 10 percent.

Vegetation.—The dominant shrubs are northern willow (Salix arctica) and netleaf willow (Salix reticulata). Forbs are Nootka lupine (Lupinus nootkatensis), Arctic yarrow (Achillea borealis), Langsdorf's lousewort (Pedicularis langsdorfii), whorled lousewort (P. verticillata), Arctic sweet coltsfoot (Petasites hyperboreus), Arctic cinquefoil (Potentilla hypartica), thymeleaf saxifrage (Saxifraga serphyllifolia), and moss campion (Silene acaulis). Grass and grasslike plants are spike trisetum (Trisetum spicatum), red fescue (Festuca rubra), boreal alopecurus (Alopecurus alpinus), shortstalk sedge (Carex podocarpa), and common woodrush (Luzula multiflora). Common fruticose lichens are Cladina arbuscula, C. rangiferina, Cladonia amaurocraea, and Thamnolia spp.

Soils.—The soils are moderately deep and are well drained. Textures are medium, and soil pH is slightly acid or neutral. Runoff is low, and permeability is rapid or moderately rapid.

Vegetation composition and production (air-dry).—Shrubs make up about 45 percent of the composition, forbs make up 50 percent, and grasses and sedges make up 5 percent. Total annual vascular herbage production is 1,130 pounds/acre. Total live lichen biomass is 2,000 pounds/acre.

Value for grazing reindeer.—This is a high-value winter grazing site for reindeer because of the exposed windswept hill summits and easily accessible forage. Willows on this site have high forage value and are preferred by reindeer during winter and early spring. Reindeer tend to concentrate on this site, which is very sensitive to grazing.

Site Name: Ephemeral Lake

Site number: 179Xb002AK

Features.—In shallow water and at the waterline, this site supports aquatic vegetation in and around temporary fresh-water lakes. Typically, the area is a lake in the spring and early summer and

becomes muddy and partly vegetated in late summer as the season progresses. Elevations range from 5 to 100 feet. Slopes are 0 to 2 percent, but most areas are level.

Vegetation.—Vegetation is characterized by a variety of sedges and rushes. The most common sedges are water sedge (Carex aquatilis) and Lyngbye's sedge (Carex Lyngbyei). Rushes (Juncus spp.) also occur with small stands of tall cottongrass (Eriophorum angustifolium). Major forbs include wild iris (Iris setosa), buttercup (Ranunculus spp.), and others.

Vegetation composition and production (air-dry).—Composition varies considerably, but this site is generally dominated by sedges and/or grasses. Total annual vascular herbage production varies widely, depending upon whether or not plants have a suitable substrate. Production ranges from 0 to 500 pounds/acre.

Value for grazing reindeer.—Although this site does not provide much reindeer forage, it is valuable to reindeer attempting to escape insect harassment. The site has minor grazing value in late summer as the water recedes. The highest value season of use for reindeer in the shallow aquatic fringe areas is winter, when the site is frozen and covered with a shallow layer of snow. The lower green portions of sedges during the winter are preferred winter forage for reindeer. Access for grazing is difficult during spring because of high water but improves as water levels drop throughout the early part of the summer.

Site Name: Forb Tundra

Site number: 179Xb057AK

Features.—This site is very similar to Forb Tundra (Coastal). In most instances, the site occupies inland areas subjected to less coastal influence than Forb Tundra (Coastal). The site is prevalent on the lower slopes adjacent to sandy benches and plains. Elevations range from 40 to 120 feet above sea level. Slopes are 1 to 8 percent.

Vegetation.—Wild celery (Angelica lucida) and Nootka lupine (Lupinus nootkatensis) dominate this site. Other forbs include Arctic yarrow (Achillea borealis), common scurvy grass (Cochlearia officinalis), Pacific hemlock-parsley (Conioselinum chinense), Tilesius wormwood (Artemisia tilesii), field horsetail (Equisetum arvense), Aleutian violet (Viola langsddorfii), monkshood (Acotinum delphinifolium), and whorled lousewort (Pedicularis verticillata). The major grasses are Holm's reedgrass (Calamagrostis holmii), lyme grass (Elymus mollis), Arctic bluegrass (Poa arctica), alpine timothy (Phleum commutatum), and wideleaf polargrass (Arctagrostis latifolia).

Soils.—The soils are moderately deep or deep and are moderately well drained or well drained. Textures are fine and medium, and soil pH is strongly acid to slightly acid. Runoff is low, and permeability is moderately slow to rapid.

Vegetation composition and production (air-dry).—Forbs make up 60 percent of the composition, and grasses make up 40 percent. Total annual vascular herbage production is 2,600 pounds/acre.

Value for grazing reindeer.—Grasses, such as wideleaf polargrass, alpine timothy, and bluegrass, provide high-value forage for reindeer from spring to fall. These same grasses decline in forage value during the winter, at which time their forage value is moderate. Lyme grass is seldom selected by reindeer during spring and summer and is of no value during winter. The large variety of forbs provides excellent spring and summer forage.

Site Name: Forb Tundra (Coastal)

Site number: 179Xb055AK

Features.—This site occurs on nearly level beach terraces and on toeslopes of rocky uplands adjacent to the coast. Elevations range from 5 to 80 feet above sea level. Slopes are 0 to 3 percent.

Vegetation.—Lyme grass (Elymus mollis), wideleaf polargrass (Arctagrostis latifolia), alpine timothy (Phleum alpinum), and bluegrass (Poa spp.) dominate this site. The major forbs are wild celery (Angelica lucida), Pacific hemlock-parsley (Conioselinum chinense), Tilesius wormwood (Artemisia tilesii), Arctic yarrow (Achillea borealis), Nootka lupine (Lupinus nootkatensis), Jacob's-ladder (Polemonium acutiflorum), field horsetail (Equisetum arvense), Aleutian violet (Viola langsddorfii), whorled lousewort (Pedicularis verticillata), common scurvy grass (Cochlearia officinalis), and monkshood (Acotinum delphinifolium).

Soils.—The soils are shallow to deep and are well drained. Textures are coarse, and soil pH is strongly acid to slightly acid. Runoff is very low or low, and permeability is moderately rapid or rapid.

Vegetation composition and production (air-dry).—Grasses make up 45 percent of the composition, and forbs make up 55 percent. Total annual vascular herbage production is 3,300 pounds/acre.

Value for grazing reindeer.—Grasses, such as wideleaf polargrass, alpine timothy, and bluegrass, provide high-value forage for reindeer during spring and fall. These same grasses decline in forage value during the winter, at which time their forage value is moderate. Lyme grass is seldom selected by reindeer during spring and summer and is of no value during winter. The large variety of forbs provides excellent spring and summer forage.

Site Name: Forb/Sedge Tundra

Site number: 179Xb059AK

Features.—This site occurs on nearly level terraces and on toeslopes of rocky uplands near the coast. Slopes are 0 to 3 percent. Elevations are 5 to 80 feet above sea level.

Vegetation.—This site is dominated by forbs, such as wild celery (Angelica lucida), Nootka lupine (Lupinus nootkatensis), and field horsetail (Equisetum arvense). Tilesius wormwood (Artemisia tilesii), Bering chickweed (Cerastium beeringianum), Arctic yarrow (Achillea borealis), monkshood (Acotinum delphinifolium), cuckoo flower (Cardamine pratensis), and common scurvy grass (Cochlearia officinalis) occur in the understory. Bigelow's sedge (Carex bigelowii) is the dominant sedge; red fescue (Festuca rubra) is the dominant grass. Lyme grass (Elymus mollis), alpine timothy (Phleum alpinum), spike trisetum (Trisetum spicatum), and woodrush (Luzula spp.) make up the remainder of the grasses and grasslike plants.

Soils.—The soils are moderately deep to very deep and are well drained. Textures are medium to coarse, and soil pH is moderately acid. Runoff is negligible or very low, and permeability is moderately rapid or rapid.

Vegetation composition and production (air-dry).—Grasses make up 51 percent of the composition, and forbs make up 49 percent. Total annual vascular herbage production is 2,450 pounds/acre.

Value for grazing reindeer.—Grasses, such as wideleaf polargrass and bluegrass, provide high-value forage for reindeer during spring and fall. These same grasses decline in forage value during the winter, at which time their forage value is moderate. Lyme grass is seldom selected by reindeer during spring and summer and is of no value during winter. The large variety and production of forbs provide excellent early, high-quality spring forage.

Site Name: Grassy Drainage

Site number: 179Xb051AK

Features.—This site occurs in narrow drainageways the heads of which are on upland rocky slopes and that end in lake-filled depressions. Elevations are 20 to 120 feet above sea level, and slopes are 1 to 10 percent. This site generally occurs near the coastal zone.

Vegetation.—This site is predominantly grassy, composed of reed grass (Calamagrostis spp.), lyme grass (Elymus mollis), and other grasses. There are a large number of different forbs, such as wild celery (Angelica lucida), Pacific hemlock-parsley (Conioselinum chinense), Tilesius wormwood (Artemisia tilesii), lagotis (Lagotis spp.), Aleutian violet (Viola langsddorfii), alpine bistort (Polygonum viviparum), and Jacob's-ladder (Polemonium acutiflorum).

Soils.—The soils are moderately deep or deep and are moderately well drained or well drained. They are medium textured but can be stratified with coarse textures. Soil pH is slightly acid. Runoff is low, and permeability is moderate or moderately rapid.

Vegetation composition and production (air-dry).—Sedges and grasses make up 60 percent of the composition, and forbs make up 40 percent. Total annual vascular herbage production is 2,780 pounds/acre.

Value for grazing reindeer.—The value of this site is excellent in spring for a short period of time after the soils have thawed and snow runoff has percolated down through the soil profile. During periods of heavy rain, the site may be flooded by over-surface flow.

Site Name: Grassy Meadow

Site number: 179Xb099AK

Features.—This site occurs in broad drainageways

and on plains and alluvial fans. It occurs near the coastal zones and in conjunction with Forb Tundra (Coastal). Elevations are 20 to 80 feet above sea level, and slopes are 1 to 10 percent.

Vegetation.—This site is predominantly a grassy site, composed of lyme grass (Elymus mollis), Holm's reedgrass (Calamagrostis holmii), wideleaf polargrass (Arctagrostis latifolia), Arctic bluegrass (Poa arctica), alpine timothy (Phleum commutatum), and boreal alopecurus (Alopecurus alpinus). The major forbs are wild celery (Angelica lucida), Pacific hemlock-parsley (Conioselinum chinense), and Nootka lupine (Lupinus nootkatensis). Less common are Arctic sweet coltsfoot (Petasites hyperboreus), Tilesius wormwood (Artemisia tilesii), northern Jacob's-ladder (Polemonium boreale), Arctic yarrow (Achillea borealis), northern starwort (Stelleria calycantha), captiate (Valeriana capitata), and Aleutian violet (Viola langsddorfii).

Soils.—The soils are moderately deep or deep and are moderately well drained or somewhat poorly drained. Soil pH is moderately acid. The soils are stony and cobbly, and textures are medium. Runoff is very low, and permeability is moderately rapid.

Vegetation composition and production (air-dry).—Grasses make up 60 percent of the composition, and forbs make up 40 percent. Annual herbage production is 3,660 pounds/acre.

Value for grazing reindeer.—The value of this site is excellent in spring for a short period of time after the soils have thawed and snow runoff has percolated down through the soil profile. Later on during middle to late summer, the forage is significantly reduced.

Site Name: Herbaceous Hillsides

Site number: 179Xb056AK

Features.—This site occurs on sloping footslopes and side slopes of hills and volcanic cones where deep soils support highly productive stands of vegetation. The site occurs most commonly on north-facing slopes; however, it can occur on all aspects. Elevations range from 60 to 120 feet above sea level. Slopes are 30 to 100 percent.

Vegetation.—This site is dominated by forbs, such as Nootka lupine (Lupinus nootkatensis), wild celery (Angelica lucida), Pacific hemlock-parsley (Conioselinum chinense), Tilesius wormwood (Artemisia tilesii), Arctic yarrow (Achillea borealis), field horsetail (Equisetum arvense), captiate (Valeriana capitata), whorled lousewort (Pedicularis verticillata), and monkshood (Acotinum delphinifolium). Lyme grass (Elymus mollis), wideleaf polargrass (Arctagrostis latifolia), shortstalk sedge (Carex podocarpa), foxtail (Alopecurus spp.), alpine timothy (Phleum alpinum), and bluegrass (Poa spp.) are the major grasses.

Soils.—The soils are deep or very deep and are well drained. Textures are medium, and soil pH is slightly acid or neutral. Runoff is low, and permeability is moderately rapid or rapid.

Vegetation composition and production (air-dry).—Forbs make up 90 percent of the composition, and grasses make up 10 percent. Total annual vascular herbage production is 4,250 pounds/acre.

Value for grazing reindeer.—Grasses and grasslike plants, such as wideleaf polargrass, shortstalk sedge, alpine timothy, and bluegrass, provide high-value forage for reindeer from spring to fall. These same grasses decline in forage value during the winter, at which time their forage value is moderate. The large variety of forbs provides excellent spring and summer forage. These areas are subject to snow accumulation during winter and on the north-facing slopes; snow is retained for longer periods into the spring than on surrounding sites.

Site Name: Lagoon

Site number: 179Xb004AK

Features.—This site occurs adjacent to the ocean environment at sea level.

Vegetation.—Major plant life is phytoplankton and kelp. The makeup of the lagoon environment is very similar to that of the ocean environment. Phreatophytes occupy the fringe areas of this site.

Soils.—No soils are described for this site. The site is a saltwater lagoon.

Vegetation composition and production (air-dry).—No data are available. Plant life is subjected to water depth fluctuation because of tidal action.

Value for grazing reindeer.—The edges of this site provide phytoplankton and kelp. The site potentially provides highly nutritious forage for reindeer, but because of the close proximity to the

village of Saint Paul, the site is infrequently used by grazing reindeer. Kelp produced in this area may be more firmly attached and less subject to breakage than kelp produced from beds in the near-shore ocean environment.

Site Name: Lake

Site number: 179Xb003AK

Features.—This site includes aquatic vegetation in and around perennial fresh-water lakes. Typically, the area is mapped as water. Elevations range from 30 to 500 feet. Slopes are 0 to 2 percent, but most areas are level.

Vegetation.—Vegetation is characterized by a variety of sedges and rushes. The most common sedges are water sedge (Carex aquatilis) and Lyngbye's sedge (Carex lyngbyei). Rushes (Juncus spp.) also occur with small stands of tall cottongrass (Eriophorum angustifolium). The major forbs are wild iris (Iris setosa) and buttercup (Ranunculus spp.).

Vegetation composition and production (air-dry).—Composition is 60 percent sedges and 40 percent forbs. Annual vascular herbage production can be as high as 6,000 pounds/acre, but median annual production for calculating reindeer forage is 400 pounds/acre.

Value for grazing reindeer.—The best forage on this site is produced around the edges of the lakes. Access is difficult during periods of high water in spring but improves as water levels drop throughout the early part of the summer. Reindeer will also graze the lake fringe areas in the winter, when lakes are frozen and covered with shallow snow. Early spring grazing during breakup and the onset of plant growth may damage this site if this pattern of use continues every year at the same time. Vegetation trampling may occur during wet periods if reindeer numbers are excessive. Overall, this site has low grazing value for reindeer.

Site Name: Lake Margin

Site number: 179Xb061AK

Features.—This site occupies fringe areas around fresh-water lakes. Elevations range from 10 to 30 feet above sea level. Slopes are 0 to 3 percent.

Vegetation.—Grasses and grasslike plants, such as sedges (Carex spp.), Bering hairgrass (Deschampsia beringensis), Alaska rush (Juncus arcticus), and Kentucky bluegrass (Poa pratensis), dominate this site. Forb composition is minor and includes Arctic yarrow (Achillea borealis), Nootka lupine (Lupinus nootkatensis), wild celery (Angelica lucida), Tilesius wormwood (Artemisia tilesii), and common scurvy grass (Cochlearia officinalis).

Soils.—The soils are very deep and are poorly drained or very poorly drained. Textures are coarse and can be high in organic matter content. Soil pH is moderately acid. Runoff is negligible, and permeability is moderately slow to rapid.

Vegetation composition and production (air-dry).—Sedges and grasses make up about 98 percent of the composition, and forbs make up 2 percent. Total annual vascular herbage production is 550 pounds/acre.

Site Name: Moss/Willow (Coastal)

Site number: 179Xb031AK

Features.—This site occurs on flat broad ridges and gently sloping hillsides near the coast. Elevations are 30 to 200 feet. Slopes are 4 to 16 percent.

Vegetation.—This site is dominated by dwarf shrubs. The dominant vegetation is oval-leaf willow (Salix ovalifolia). The dominant grass is red fescue (Festuca rubra). Forbs are Nootka lupine (Lupinus nootkatensis) and Pacific hemlock-parsley (Conioselinum chinense). This site supports fruticose lichens.

Soils.—The soils are generally deep and are moderately well drained. Textures below the surface are medium, but a sand layer commonly occurs at the surface. Soil pH is neutral. Runoff is low, and permeability is moderate to rapid.

Vegetation composition and production (air-dry).—Shrubs make up about 40 percent of the composition, sedges and grasses make up 15 percent, and forbs make up 45 percent. Total annual vascular herbage production is 1,010 pounds/acre. Total live lichen biomass is 3,000 pounds/acre.

Value for grazing reindeer.—This is a high-value winter reindeer range. Careful monitoring of grazing is

needed to prevent overuse of the oval-leaf willow. Reindeer have a tendency to concentrate on this site during winter because they are attracted to the lichens.

Site Name: Mud Flats

Site number: 179Xb083AK

Features.—This site is predominantly a mud flat influenced by tidal action. It occurs immediately inland between the tidal flats and the vegetated zones. Elevations are 1 to 5 feet above sea level. Slopes are 0 to 2 percent, but most areas are level.

Vegetation.—Vegetation is characterized by a variety of kelp and sea lettuce fragments that float in with the high tides.

Vegetation composition and production (air-dry).—Composition varies between kelp and sea lettuce. There is no annual production on this site. Accumulated plant fragments can be 0 to 500 pounds/acre.

Value for grazing reindeer.—This site does not provide forage but is a valuable site for reindeer to utilize for insect relief during warm periods.

Site Name: Rocky Beach

Site number: 179Xb081AK

Features.—This site occurs immediately adjacent to the ocean. It includes low and high tide zones as well as the zones affected by storm tides. Elevations are 0 to 10 feet above sea level. Slopes are 0 to 5 percent. This site occurs intermittently along the beach zone, depending upon parent material and age of beach material.

Vegetation.—No vegetation grows on this site. Flotsam and kelp accumulate on the beach.

Vegetation composition and production (air-dry).—There are no macro-flora growing on this site. Several tons of kelp biomass may accumulate after storm tides.

Value for grazing reindeer.—Important quantities of kelp accumulate on the beach after major storm tides during any time of the year. Important minerals, such as salt (sodium chloride), and important elements, such as potassium, iodine, phosphorus, and trace elements, can be acquired from the kelp; these minerals help to supplement diets that are potentially deficient in minerals. Sites that are accessible can provide high-value kelp when available.

Site Name: Rocky Shrub Tundra

Site number: 179Xb058AK

Features.—This site occurs in gently sloping rocky inland areas. It is similar in structure to, and frequently associated with, the Dwarf Shrub Tundra (Upland) site. Rock outcroppings are interspersed throughout the site. Elevation ranges from 120 to 500 feet above sea level, and slopes are 1 to 10 percent.

Vegetation.—The dominant shrubs are northern willow (Salix arctica) and black crowberry (Empetrum nigrum). There are a wide variety of forbs. Some of the most common forbs are Arctic yarrow (Achillea borealis), Nootka lupine (Lupinus nootkatensis), wild celery (Angelica lucida), Arctic sweet coltsfoot (Petasites hyperboreus), Pacific hemlock-parsley (Conioselinum chinense), Bering chickweed (Cerastium beeringianum), whorled lousewort (Pedicularis verticillata), boreal whitlowgrass (Draba borealis), and field horsetail (Equisetum arvense). Grasses and grasslike plants are showy sedge (Carex spectabilis), Bering sea sedge (C. nesophila), alpine timothy (Phleum alpinum), spike trisetum (Trisetum spicatum), red fescue (Festuca rubra), wideleaf polargrass (Arctagrostis latifolia), lyme grass (Elymus mollis), common woodrush (Luzula multiflora), and Arctic bluegrass (Poa arctica). Lichens are Cladina arbuscula, C. rangiferina, Cladonia amaurocraea, and Thamnolia spp.

Soils.—The soils are shallow to moderately deep and are moderately well drained or well drained. They are stony and cobbly and medium textured. Soil pH is slightly acid. Runoff is very low, and permeability is moderately rapid.

Vegetation composition and production (air-dry).—Shrubs make up about 40 percent of the composition, forbs make up about 45 percent, and grasses and sedges make up 15 percent. Total annual vascular herbage production is 1,800 pounds/acre. Total live lichen biomass is 5,000 pounds/acre.

Value for grazing reindeer.—This is a high-value winter grazing site for reindeer. Salix spp. growing on this site provide good forage and have high preference value during winter and early spring. Reindeer

tend to concentrate on this site, which is very sensitive to grazing. Herders should use caution when moving reindeer through these areas. Herding techniques should be subtle, because crowding the reindeer and causing them to mill may result in hoof injuries and broken legs.

Site Name: Rocky Uplands

Site number: 179Xb085AK

Features.—This site occurs on upland rocky slopes. Rock outcroppings are interspersed throughout the site. Elevations range from 120 to 500 feet above sea level. Slopes range from 0 to 30 percent.

Vegetation.—Shrubs dominate this site. The major shrubs are black crowberry (Empetrum nigrum), northern willow (Salix arctica), shortfruit willow (S. brachycarpa), and fir club moss (Lycopodium selago). There are numerous species of forbs. Some of the more conspicuous forbs are wild celery (Angelica lucida), boreal sagebrush (Artemisia arctica), purple wormwood (A. globularia), mountain hairbell (Campanula lasiocarpa), Pacific hemlock-parsley (Conioselinum chinense), and wood fern (Dryopteris dilatata). Less conspicuous forbs are pale gentian (Gentiana glauca), Ross's avens (Geum rossii), Arctic stitchwort (Minuartia arctica), Arctic poppy (Papaver lapponicum), Jacob's-ladder (Polemonium acutiflorum), alpine bistort (Polygonum viviparum), brook saxifrage (Saxifraga punctata), whorled lousewort (Pedicularis verticillata), moss campion (Silene acaulis), and Arctic starflower (Trientalis europaea). Grasses and rushes include wideleaf polargrass (Arctagrostis latifolia), common woodrush (Luzula multiflora), and bluegrass (Poa spp.). Lichen species are Cladina arbuscula, C. rangiferina, Cladonia amaurocraea, and Thamnolia spp.

Soils.—Soils are shallow or moderately deep and are well drained. They are stony and cobbly, and textures are medium. Soil pH is moderately acid. Runoff is low or very low, and permeability is moderate or moderately rapid.

Vegetation composition and production (air-dry).—Shrubs make up about 60 percent of the composition, forbs make up 15 percent, and grasses and sedges make up 25 percent. Total annual vascular herbage production is 420 pounds/acre. Total live lichen biomass is 5,000 pounds/acre.

Value for grazing reindeer.—This is a high-value winter grazing site for reindeer. Willows growing on this site have high forage and preference value during winter and early spring. Reindeer tend to concentrate on this site, which is very sensitive to grazing.

Site Name: Rocky Volcanic Cone

Site number: 179Xb088AK

Features.—This site occurs on steep slopes of volcanic cones. Elevation ranges from 120 to 660 feet above sea level. Slopes range to 100 percent.

Vegetation.—Shrubs dominate this site. The major shrubs are northern willow (Salix arctica), ovate-leaf willow (Salix cyclophylla), netleaf willow (Salix reticulata), black crowberry (Empetrum nigrum), and lingonberry (Vaccinium vitis-idaea). The most dominant forbs are Tilesius wormwood (Artemisia tilesii), Nootka lupine (Lupinus nootkatensis), boreal sagebrush (Artemisia arctica), and wild celery (Angelica lucida). Rushes and grasses are shortstalk sedge (Carex podocarpa), showy sedge (C. spectabilis), Siberian oatgrass (Trisetum sibiricum), alpine timothy (Phleum alpinum), and Arctic bluegrass (Poa arctica). Prominent lichen species are Cladina arbuscula, C. rangiferina, Cladonia amaurocraea, and Thamnolia spp.

Soils.—The soils are deep or very deep and are well drained. They are very gravelly or very cobbly, and textures are medium to coarse. Soil pH is moderately acid. Runoff is negligible, and permeability is very rapid.

Vegetation composition and production (air-dry).—Shrubs make up about 40 percent of the composition, forbs make up 50 percent, and grasses and sedges make up 10 percent. Total annual vascular herbage production is 1,660 pounds/acre. Total live lichen biomass is 1,000 pounds/acre.

Value for grazing reindeer.—This site provides high-value winter forage for reindeer. Willows growing on this site also have high forage value during the winter and early spring.

Site Name: Rubble Lava Flow

Site number: 179Xb086AK

Features.—This site occurs as a lava flow on the western part of the island. Vegetated areas are interspersed throughout the site. Elevations range from 40 to 300 feet above sea level. Slopes range from 0 to 60 percent.

Vegetation.—Shrubs dominate this site. The major shrubs are black crowberry (Empetrum nigrum), northern willow (Salix arctica), cloudberry (Rubus chamaemorus), and lingonberry (Vaccinium vitis-idaea). Nootka lupine (Lupinus nootkatensis) is the most prominent forb. Other subdominant forbs are Pacific hemlock-parsley (Conioselinum chinense), spreading wood fern (Dryopteris dilatata), pale gentian (Gentiana glauca), Ross's avens (Geum rossii), Arctic stitchwort (Minuartia arctica), Arctic poppy (Papaver lapponicum), Jacob's-ladder (Polemonium acutiflorum), alpine bistort (Polygonum viviparum), brook saxifrage (Saxifraga punctata), and boreal sagebrush (Artemisia arctica). Grasses and rushes are wideleaf polargrass (Arctagrostis latifolia), Bering hairgrass (Deschampsia beringensis), alpine fescue (Festuca brachyphylla), tundra fescue (F. ovina), alpine timothy (Phleum alpinum), alpine timothy (P. commutatum), Kentucky bluegrass (Poa pratensis), Siberian oatgrass (Trisetum sibiricum), common woodrush (Luzula multiflora), and small-flowered woodrush (L. parviflora). Lichen species are Cladina arbuscula, C. rangiferina, Cladonia amaurocraea, and Thamnolia spp.

Soils.—The soils are shallow and well drained. They are very high in organic matter content, and soil pH is moderately acid. Runoff is low, and permeability is very slow.

Vegetation composition and production (air-dry).—Shrubs make up about 60 percent of the composition, forbs make up 30 percent, and grasses and sedges make up 10 percent. Total annual vascular herbage production is 1,380 pounds/acre. Total live lichen biomass is 5,000 pounds/acre.

Value for grazing reindeer.—This site provides high-value winter forage for reindeer. Willows growing on this site also have high forage value during the winter and early spring.

Site Name: Sandy Beach

Site number: 179Xb080AK

Features.—This site occurs immediately adjacent to the ocean. It includes the low and high tidal zones as well as the zones influenced by storm tides. The site occurs intermittently along the water edge and varies depending upon tidal fluctuations and hydraulics resulting from high-energy wave impact. This site is associated with the Rocky Beach site. The occurrence or absence of this site is dependent upon parent material and landforms. Elevations are 0 to 10 feet above sea level. Slopes are 0 to 5 percent.

Vegetation.—No vegetation grows on this site. Flotsam and kelp accumulate on the beach.

Vegetation composition and production (air-dry).—There are no macro-flora growing on this site. Several tons of kelp biomass may accumulate after storm tides.

Value for grazing reindeer.—Important quantities of kelp accumulate on the beach after major storm tides during any time of the year. Important minerals, such as salt (sodium chloride), and important elements, such as potassium, iodine, phosphorus, and trace elements, can be acquired from the kelp; these minerals help to supplement diets that are potentially deficient in minerals. Sites that are accessible can provide high-value kelp when available. This site provides valuable feeding habitat for shore birds and waterfowl. Reindeer utilize the area for insect relief.

Site Name: Sea Cliffs

Site number: 179Xb082AK

Features.—This site occurs immediately adjacent to the ocean. Cliffs are subjected to influence from tidal action and storm wave hydraulics. Elevations range from sea level to 800 feet above sea level. Slopes are 100 percent to vertical.

Vegetation.—Vegetation is primarily grass, sedges, and forbs.

Vegetation composition and production (air-dry).—Species composition varies widely, depending upon slope and soil conditions. Total annual vascular herbage production is 0 to 500 pounds/acre.

Value for grazing reindeer.—Reindeer do not use this site. The site has high value for bird nesting habitat.

Site Name: Sedge Meadow

Site number: 179Xb060AK

Features.—This site occupies coastal and inland areas on the west coast of Saint Paul Island, on gently sloping plains and upland slopes. Elevations range from 60 to 200 feet above sea level. Slopes are 6 to 15 percent.

Vegetation.—Sedges and grasses, such as shortstalk sedge (Carex podocarpa), Bering hairgrass (Deschampsia beringensis), Kentucky bluegrass (Poa pratensis), and red fescue (Festuca rubra), dominate this site. The major forbs include Pacific hemlock-parsley (Conioselinum chinense), Arctic yarrow (Achillea borealis), Nootka lupine (Lupinus nootkatensis), wild celery (Angelica lucida), captiate (Valeriana capitata), Tilesius wormwood (Artemisia tilesii), weaselsnout (lagotis glauca), and rock jasmine (Androsace chamaejasme). The drier, well drained areas of this site support shrubs, such as ovate-leaf willow (Salix cyclophylla), netleaf willow (Salix reticulata), and black crowberry (Empetrum nigrum).

Soils.—The soils are moderately deep and are moderately well drained or well drained. Textures are fine and medium, and soil pH is strongly acid or moderately acid. Runoff is low or medium, and permeability is moderately slow to moderately rapid.

Vegetation composition and production (air-dry).—Sedges and grasses make up about 45 percent of the composition, forbs make up 30 percent, and shrubs make up 25 percent. Total annual vascular herbage production is 1,610 pounds/acre.

Value for grazing reindeer.—Sedges and Bering hairgrass provide high-quality forage during winter and spring. Forage access may be limited on this site in early spring because of deep snow and ice lenses that develop as a result of the lake margin's location.

Site Name: Sedge Meadow (Wet)

Site number: 179Xb062AK

Features.—This site occurs in sinks and low-elevation, shallow lakes, ponds, and depressions. Elevations are near sea level to 30 feet above sea level, and slopes are 0 to 3 percent. This site occupies coastal environments.

Vegetation.—This site is predominantly a sedge-dominated site, composed of Lyngbye's sedge (Carex lyngbyei), water sedge (Carex aquatilis), and silvery sedge (Carex canescens). Flam buttercup (Ranunculus reptans) and fourleaf marestail (Hippuris tetaphylla) are the dominant forbs.

Soils.—The soils are very deep and are poorly drained. Textures are coarse to medium, and soil pH is moderately acid. Runoff is negligible, and permeability is very slow to rapid.

Vegetation composition and production (air-dry).—Sedges and grasses make up 95 percent of the composition, and forbs make up 5 percent. Total annual vascular herbage production is 3,030 pounds/acre.

Value for grazing reindeer.—This site provides excellent winter range because of succulent green sedge shoots and roots covered by snow that may be available to foraging reindeer. The site has low value for spring grazing because of shallow ponded water. During periods of heavy rain or high tide, the site may be severely flooded.

Site Name: Wet Lake Bed (Juncus)

Site number: 179Xb052AK

Features.—This site occurs in nearly level depressions between dunes and on sandy plains. Elevations are sea level to 50 feet above sea level. Slopes are 0 to 3 percent. This site occurs near the coast.

Vegetation.—This site is characterized by rush (Juncus ambiguus) and Lyngbye's sedge (Carex lyngbyei) with an understory of oval-leaf willow (Salix ovalifolia). Major grasses are Bering's tufted hairgrass (Deschampsia cespitosa) and bluegrass (Poa spp.). Forbs are field horsetail (Equisetum arvense), Kotzebue's grass of Parnassus (Parnassia kotzebuei), sudetic lousewort (Pedicularis sudetica), and buttercup (Ranunculus spp.).

Vegetation composition and production (air-dry).—Sedges and grasses make up 65 percent of the composition, and forbs make up 28 percent. Total annual vascular herbage production is 1,120 pounds/acre.

Value for grazing reindeer.—This site provides excellent winter range because of succulent green sedge shoots and roots covered by snow that may be available to foraging reindeer. It has low value

in spring because of wetness. During periods of heavy rain or high tide, the site may be flooded.

Site Name: Wet Meadow Complex

Site number: 179Xb053AK

Features.—This site occurs in nearly flat areas adjacent to the coast in the proximity of lagoons and salt marshes. The site is subject to periodic tidal inundation. Elevations are sea level to 5 feet above sea level. Slopes are 0 to 3 percent.

Vegetation.—This site contains mixtures of sedge (Carex spp.) and wideleaf polargrass (Arctagrostis latifolia). The sedge component has a water table at or near the surface for most of the year. Immediately adjacent to the sedge zone, in better drained areas with a deeper water table, are grassy areas dominated by wideleaf polargrass and lyme grass (Elymus mollis). Forbs are starwort (Stellaria spp.), common scurvy grass (Cochlearia officinalis), Pacific hemlock-parsley (Conioselinum chinense), and Aleutian violet (Viola langsddorfii).

Soils.—The soils are very deep and are poorly drained or very poorly drained. They may have a thick organic layer or sand at the surface. Soil pH is neutral. Runoff is very low or negligible, and permeability is rapid.

Vegetation composition and production (air-dry).—Sedges and grasses make up 95 percent of the composition, and forbs make up 5 percent. Total annual vascular herbage production is 1,970 pounds/acre.

Value for grazing reindeer.—Sedges provide high-value forage for reindeer during winter when the area is covered by snow. Wideleaf polargrass maintains its forage value well into the winter and provides excellent early spring forage. Lyme grass is seldom selected by reindeer during spring and summer and is of no value during winter.

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170°22'30"W

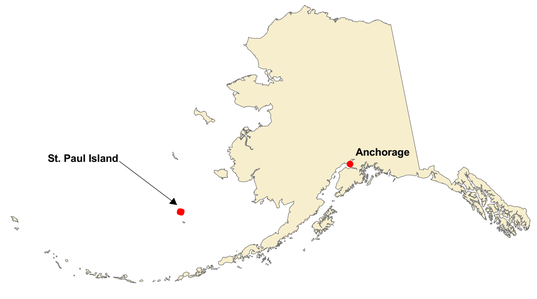
170°15'0"W

170°7'30"W

57°15'0"N

57°7'30"N

Soil Survey of St. Paul Island Area, Alaska



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This soil suvey was compiled by the U.S. Department of Agriculture, Natural Resources Conservation Service and cooperating agencies. Base maps are orthophotos prepared by the U.S. Department of Interior, Geological Survey, Ikonos satellite imagery, June 17, 2001. North American Datum of 1983 (NAD83), GRS80 UTM Zone 2. Coordinate grid ticks are approximate. Digital soils data are available for download.

0 1 2 3 Miles

1:24,000